

APPENDIX I.

I.—PHYSICAL CAUSES OF INDIAN FAMINE

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Life, whatever shape it takes, is passed in a continued struggle between the forces that tend to preserve and to destroy it. Among the most active of these forces are the conditions of local climate, and notably those of atmospheric heat and moisture. Speaking broadly, the same conditions stimulate at once the conservative and destructive tendencies by adding to their intensity; so that where the productive powers of nature are the greatest, there also the opposite influences are commonly the most active. Thus, in the warmer parts of the earth, where the gifts of nature are most profuse, we have to encounter in their extreme form the devastating forces of tempest, drought, flood, and disease; a few weeks, or may be hours, sweep away the results which it has taken years of the labour of man, or the more silent industry of nature to accumulate. The evidence of the truth of this is unhappily too close at hand. You will find it in the drought which is now laying the rod of famine on a large part of southern and western India; in the similar calamity that fell on parts of Bengal three years ago; in the sudden disaster which within the last few months destroyed perhaps 100,000 human beings in two or three hours in the delta of the Ganges by a flood caused by a cyclone; in the ravages of cholera, which sweeps away the survivors of famine or flood; and in the long series of past occurrences of a similar character recorded in the history of India.

The conclusion is painfully forced upon us that practical civilization has gone a very little way when we find that hardly more than a first step has yet been taken in the successful application of our knowledge and material resources to warding off calamities such as these. It is not, however, my intention to dwell on this aspect of the subject, serious though it be. My present task is a much more limited one, that of placing before you, to the best of my ability, an explanation of the physical conditions under which one class of these scourges of India arises, namely, seasons of drought.

Before I enter on the more special matters with which I shall have to deal, I think it desirable to draw attention to certain points bearing on the general subject of Indian droughts and famines, and their consequences, on which it seems to me that erroneous impressions are prevalent.

In the first place, great though the calamity of an Indian famine be, both to the population directly affected by it, and to the general community that has to bear the loss it causes, yet its gravity may easily be exaggerated. There has been not a little declamation to the effect that the frequent recurrence of Indian famines renders the permanent improvement and well being of the country almost hopeless. Let us compare India in this respect with our own country, the prosperity of which cannot be questioned. The two last and severest Indian famines of recent years, that of Bengal, and that under which a large tract now suffers, may be reckoned to have cost the State in all sixteen millions sterling. Of this sum, perhaps, two or three millions may represent loss of revenue, and the remainder the cost of relief. Now the ordinary yearly cost of Poor Law relief in England is about seven millions sterling, while a few years ago it was eight millions. Again, at the present time in India the population in receipt of relief in the British districts is estimated at about one and a quarter millions in all. The number of persons who receive relief in England at the present time may be reckoned at 700,000 for every day of the year, permanently, and a few years ago it was as much as one million.

Further, it is a good authority, that of the thirty-three millions of inhabitants of the United Kingdom, eighteen millions are fed by the produce of our islands, and fifteen millions by imported food. It

is not possible to form any opinion of food produced locally and the Indian province suffering from famine. country, as a whole, it may be said with the food supply easily provides for the entire under all known circumstances, and that severe Bengal famine the export of grain without very great diminution in spite of failure of crops.

Much misconception also exists as to the population of India. It is no doubt true some districts the population is very great, but by no means universal. In the provinces now suffering the population in the worst districts is only 150 to the square mile, and the highest average does not come to 250 to the square mile; the average of the British Isles being about 260 per square mile. In the Bengal famine the density of population was much greater, being in some districts even 600 or 700 to the square mile. There is no positive evidence that the population of any part of India has rapidly increased of late years. On this subject we have very few facts on which to rely, and the opinions frequently expressed on it are necessarily based on surmise, and are, in my own judgment, more likely to be wrong than right. The last, and only census in the province of Bengal was taken till 1872, and it will show the utter want of value of guesses on such subjects when I mention that the actual enumeration showed that the population was sixty-seven millions, where previous estimates had made it forty-two millions.

I shall now proceed to the main subject of my address.

Let me ask your attention to the map of India before you. On the north, you see the mountainous region of Tibet, the southern border of which is formed by the ranges known as the Himalaya, extending over a length of about 2,000 miles, and rising along the whole line into the region of perpetual snow; few of the passes being at a less altitude than 15,000 or 16,000 feet, peaks of 20,000 feet being abundant, and the highest summit yet measured reaching 29,000 feet above the sea level. On the west, this elevated region is connected with the table-land of Afghanistan and Baluchistan, the border of which forms the frontier of India along the Indus. On the east, high mountains spread out from Tibet southward, constituting the western parts of China, and extending to the sea in Burma, the Malay peninsula, and Cochin-China; the eastern frontier of British India lies along the outer ramifications of these ranges from Assam, by the delta of the Ganges and Brahmaputra, to the districts of Arracan and Burmah.

The northern provinces of British India occupy a great plain which flanks the Himalaya along its entire length, expanding at both extremities to the sea; on the east over the delta of the Ganges, which is roughly coincident with the province of Bengal, and on the west through the Punjab and Sindh, along the course of the Indus and its great tributaries to the Arabian sea. This plain rises at its highest point between the Sutlej and the Jumna to something less than 1,000 feet above the sea, presenting over its whole extent an almost unbroken surface, which has the appearance of perfect horizontality.

What is commonly spoken of as the Indian peninsula is occupied by a table-land, roughly triangular in shape, having its broadest end immersed, so to speak, in the continent, to the extent of about one-third of the distance from its base to its apex, the immersed portion being surrounded by the great northern plain. The southern half of the western flank of this table-land forms the line of mountains called the Western Ghâts, and the northern half the hills that bound Rajputana

ni. The highest points on the peninsula hardly exceed 4,000 feet in the Nilgheri mountains, near the peninsula, rise to 8,000 feet. The margin of the table-land is less sharply defined in the western, and is less in elevation also, the extent of low-lying land between it and the northern border is still less strongly marked. The table-land gradually declines in the north-west, and is hardly distinguished, the table-land of the plain. The average altitude of the table-land is about 1,500 feet above the sea, being generally greater on the west than on the east, with two remarkable exceptions all the great rivers that carry off the drainage, westward.

The disturbances are due to the occurrence of a line of disturbance or discontinuity, which crosses the peninsula from south-west to north-east, being the valleys of the Nerbudda river on the west, and the exceptional rivers just referred to, on the east, and the lines of elevation between them, known as the Vindhya, Satpura, and other ranges. The Taptee, the second of the exceptional rivers flowing westward, occupies a valley, parallel to, and not far removed from that of the Nerbudda, and no doubt having its origin in the same local causes.

The table-land of the peninsula, strictly speaking, could be held to terminate at the Nilgiri mountains, immediately south of which a complete interruption of the Western Ghats takes place. The mountains which extend from this point to the apex of the peninsula at Cape Comorin rise to a considerable elevation at some places, but have no longer any of the characters of a table-land.

The part of India which is at the present time suffering from the effects of drought includes nearly all that which lies on the summit of the table-land, from a line 100 miles south of the Taptee river to the Nilgiris, and a band 200 miles wide, measuring from the Western Ghats eastward, as well as the low-lying land on the east coast between the sea and the foot of the table-land. The British area affected is about 150,000 square miles, with a population of more than thirty millions. You may compare with this the area and population of Spain, which has 200,000 square miles and seventeen millions of inhabitants; and Italy, with 100,000 square miles, and twenty-four millions of inhabitants; you can thus judge of the vast magnitude of the task before the Government in dealing with a scarcity spread over such an extent of country.

These same regions are always liable to suffer from deficient rainfall, and the low-lying coast districts not now affected, north of the Kistna, have also on former occasions suffered in an extreme degree. The Bengal drought of 1873 extended over the part of the great northern plain immediately contiguous to the Gangetic delta, and the western border of the delta. It was very exceptional, so far as concerns the portion of the area affected that lay north of the Ganges and in the delta. The portions of the great plain lying south of the Ganges along the northern border of the table-land, from the junction of the Sone with the Ganges as far as the Sutlej, have at intervals suffered from severe drought, proximity to the Himalaya being, as a rule, associated with more favourable rainfall.

The part of the table-land north of the Nerbudda, embracing Rajputana, has suffered very severely within recent times.

The first point to consider in relation to the matter before us will naturally be the ordinary distribution of the rain. This is shown on the map, on which have been drawn lines indicating approximately the average amount of rain over the whole country.

With some exceptions, to which special attention will be necessary, the chief fall of rain in India takes place during the period of the south-west monsoon, that is, from May to October, the remainder of the year being comparatively dry. These summer rains prevail over the whole of the coasts of southern Asia which are under the influence of the south-west winds, namely, from Arabia to China; and they are felt in a more or less marked manner to great distances inland, being abundant over India generally, and along the whole of the southern slope of the Himalaya from the Brahmaputra to the Indus.

The rain at this season is very heavy along the coast of the Malay peninsula, through Burmah to Assam and

the Himalaya beyond. On the north its progress is in a great degree arrested by the snowy mountains, so that it only just reaches in the slightest manner the southern borders of Tibet. In the north-west quarter these rains gradually cease in eastern Afghanistan, the city of Kabul being beyond their influence, and generally they do not extend in an important degree beyond the outer ranges of hills that flank the lower course of the Indus.

On the west, or Malabar coast of the peninsula, the summer rainfall is extremely high. On the east, or Coromandel coast, the quantity at this season is, however, comparatively small, the principal fall there taking place in October and November, after the south-west monsoon has ceased. To this apparent anomaly I shall again revert.

Besides the principal season of summer rain, there is clearly developed in the north of India a distinct season of winter rain, which has its maximum nearly corresponding with the period of greatest cold, in January and February. This rain becomes less important as we move southward, being hardly noticeable in Bombay or Calcutta, or farther south; while in Afghanistan, where it is prolonged into the spring, it is the heaviest and most valuable of the whole year.

I need, perhaps, hardly remark that the source from which the summer rains of India are supplied is the continued stream of air highly charged with vapour which is poured over the land from the Indian Ocean by the winds that blow during the season, known as the south-west monsoon. To apprehend correctly how these winds thus operate some explanation of their cause and mode of occurrence will be requisite.

It is a common but erroneous mode of stating the efficient cause of wind to refer it to difference of temperature of two contiguous areas; namely, that cold air being more dense and heavier, necessarily displaces hot air, which is lighter, the accompanying motion being wind. Indirectly, no doubt, the difference of temperature often operates in this manner; but the true cause of all movements of the atmosphere which we describe as wind is wholly mechanical, being difference of pressure at neighbouring places, and the facts cannot be properly dealt with if this is lost sight of.

The upper strata of the atmosphere press, under the action of gravity, on those at the earth's surface, and the effect is indicated by help of the barometer, which measures the pressure of the air at any moment in inches of mercury; 30 inches of mercury over any surface being nearly equal in weight, or producing equal pressure, to that caused by the whole atmosphere over the same surface. The pressure of course diminishes as we ascend, there being less and less air above us, and the barometer falls. Moreover, when the atmosphere is at rest, an equal superincumbent mass, accompanied by equal pressure, will be found at all places equally distant from the earth's surface; or, in other words, the planes of equal pressure will be truly horizontal. If, at any time, this is not the case, a result follows like that which takes place in a body of water, the surface of which is not horizontal; namely, the air flows from the higher towards the lower points, which movement continues till the planes of equal pressure are restored to horizontality.

Changes of temperature over any area by causing the expansion or contraction of the superincumbent body of air disturb the levels of the planes of equal pressure in the upper strata of the atmosphere, heat causing them to rise and to separate from one another, and cold bringing them down and closer together; by reason of which the air flows off on all sides, above, from a relatively heated area, and flows in on all sides above, to a relatively cooled one. The immediate consequence of such movements in the upper strata will be to reduce the pressure of the surface over the hot area from which air has been thrown off, and to increase it over the cold one towards which air has flowed in, and this will be accompanied by a wind at the surface, blowing from the cold area to the hot one. The movements in the upper and lower parts of the atmosphere are thus the converse one of the other, and tend to restore the equilibrium or horizontality of the planes of pressure disturbed by changes of temperature. But though this is the general law which regulates such movements, the actual conditions under which the atmosphere is placed, and more particularly the influence of the rotation of the earth, which is imparted by friction to the superincumbent air, and the imperfect fluidity of the air which admits of local accumulations of energy under the action of sudden or irregular changes of temperature, are constantly causing disturbances of what might otherwise have been comparatively simple movements, so

that the resulting directions of the wind as observed are not much more readily connected with the differences of pressures than with the differences of temperatures which lead to them. In our own latitudes, for instance, the direction of the wind is commonly more nearly parallel to the lines of equal pressure at the surface than perpendicular to them, which would clearly be the case if the winds were chiefly regulated by direct differences of pressure.

It is no doubt well known to you that two well-marked seasons of periodical wind recur regularly year by year along the coasts of southern Asia and over the neighbouring seas, known as the south-west monsoon of the summer months, and the north-east monsoon of the winter months. The high summer temperature of the great arid plateaus of Asia causes a dispersion of the air over them, which is marked by a very considerable fall of the barometric pressure over the whole continent, and is accompanied by a less great but perfectly distinct increase of pressure over the adjoining ocean regions south of the equator, which then have their winter season. Under the great difference of pressure thus established the air flows in powerfully towards the continent of Asia from the surrounding seas, the movements becoming well-marked in April with the rapid rise of temperature that then commences, and attaining their maximum in July, soon after the summer solstice. This is the south-west monsoon. When the temperature of Asia falls, which it does in September, as the sun goes rapidly south, the barometric pressure begins to be restored, and it becomes generally equalized over the southern parts of the continent in October, when this monsoon ceases.

The converse action takes place in the winter. The same causes which led to the great summer heat in Asia, namely, the great extent of dry and barren surface, produce excessive winter cold, which is accompanied by a well-marked increase of barometric pressure, again to be followed by the development of winds from the land towards the sea, which give rise to the north-east monsoon.

As is well known, the winds blowing northward from the equator bring air which has there acquired a high eastward velocity of rotation to places where the velocity of surface rotation is less, and therefore are felt as winds impressed with an eastward movement, and thus being combined with their northward movement produces the south-west winds of the summer monsoon. The movements towards the equator in a similar manner lead to the north-east winds of the winter monsoon.

But though this supplies the general key to the great changes in the winds of southern Asia, the local succession of their directions depends on special local influences, which disguise the general law, and may even in a great measure counteract it.

The south-west monsoon begins in the Arabian sea with north-west and westerly winds, which draw round to south-west as the summer advances, and again fall back by west to north in the autumn and winter. In the Bay of Bengal the south-west monsoon blows as a southerly or south-easterly wind, being succeeded by north-easterly winds after October, which in turn give place as the winter months succeed, to winds from north and north-west.

Again, the winds during the south-west monsoon do not generally blow over the land in a south-westerly direction. The current of air flowing in from the sea is gradually diverted towards the area of least pressure, and at the same becomes dissipated and loses much of its original force as it passes from the area of greater pressure and lower temperature to that of reduced pressure and higher temperature. The irregularities of the land surface also operate powerfully in destroying the uniform character which the winds maintain while passing over the uniform surface of the ocean. The great mountain ranges along the north of India act, moreover, as an effectual barrier to the movements of the wind in that direction. It is from these causes that we find the winds which blow over the Arabian sea from the south-west become southerly winds as they pass up the valley of the Indus; the winds of the Bay of Bengal which have already been diverted to the south, acquire an easterly tendency as they blow over the delta of the Ganges, and pass as south-east winds along the foot of the Himalaya towards the hotter regions in the north-west.

The body of air which is thus carried by the winds of the south-west monsoon from the ocean over India necessarily comes up highly charged with watery vapour; the conditions under which this vapour is released over the land in the form of rain, I next have to explain.

You are all familiar with the fact that water when heated passes into the condition of an invisible vapour, and that vapour when cooled is condensed again into water. Watery vapour, like air, being an elastic fluid, is liable to vary in density and weight, and the greater the density the larger will be the quantity of water held in suspension. But the quantity of water that can thus be kept in the state of vapour depends on the temperature, and therefore when the temperature falls below a certain point some of the vapour is restored to the state of water, and only that part remains in the gaseous form that the particular temperature permits. When air contains as much vapour as is consistent with its temperature, it is said to be saturated with moisture; the proportion of actual vapour to the greatest possible quantity is termed the proportion of saturation.

The vapour formed by evaporation at the earth's surface, which is much less dense than ordinary air, constantly tends to diffuse itself upwards, and thus becomes disseminated in the atmosphere. At the same time, since the temperature of the air falls about 1° Fahr. for each 300 feet that we rise from the sea level, the operation of this law leads to such a reduction of the heat in the upper strata, as to cool the ascending vapour, and at length to condense all that is in excess of what the reduced temperature of each successive stratum admits of being retained in the gaseous form.

The supply of vapour passing upwards is therefore being constantly reduced as it ascends, and it thus happens that nine-tenths of the whole quantity of vapour in the entire atmosphere are to be found below an altitude of 20,000 feet. Where the evaporation at the surface is very copious, as it would be in a tropical sea with an air temperature for instance of 80° Fahr., if the vapour spread itself upwards according to the known laws which it obeys, we might commonly find the air near the surface to contain say four-fifths of the quantity required for saturation, and it would therefore be perfectly transparent, and no condensation would occur. But these conditions would at length lead to the quantity of vapour that reached an elevation of 4,000 feet being incompatible with its existence there in a gaseous form, because the air temperature would be only 68° , while a temperature of about 70° would be necessary to admit of the vapour retaining its gaseous condition. Condensation would therefore have taken place below 4,000 feet, and a stratum of clouds would have formed, which according to circumstances might either be carried away and dispersed by winds, or discharge downwards the condensed water as rain. There is thus in the atmosphere at all times and places a more or less definite tendency towards the formation of cloud and the fall of rain by reason of the conflicting laws of the diffusion of vapour and of the distribution of temperature in the atmosphere; and in strict truth our search might rather be for the causes that intercept or interfere with this action, than for those under which it continues to operate.

There are, however, circumstances which may so greatly add to the intensity of the condensation of vapour in the upper regions of the air as to call for special notice. Where a wind charged with vapour blows over an irregular surface, as from the sea across the face of a mountain, and the whole body of moving air is thus forced upwards, the expansion that follows is accompanied by a fall of temperature analogous to that which is observed in all the higher strata of the atmosphere; and as in this case the whole body of vapour is cooled down, instead of, as in the hypothesis I before made, only the portion that rose by diffusion to the higher level, the condensation is proportionally more copious and sudden, and takes the form of heavy clouds that rest on the mountain, or of rain that falls upon its slopes.

The mixture of cold with hot currents of air highly charged with vapour is another possible cause of the condensation of rain; though I think a not frequent one in the countries to which our attention is now specially directed.

We are now in a position to consider somewhat more in detail the phenomena of the Indian periodical rainy seasons. The primary agents are the high summer temperature of the continent, and the consequent influx of a current of air from the south, blowing over a great expanse of tropical ocean, and consequently highly charged with vapour. If at first there appears something anomalous in the chief rainy season occurring at the hottest part of the year, whereas the condensation that causes rain is essentially a result of cold, we have to remember that the requisite cold is relative and not absolute, and that as the water suspended in the air is

greater in proportion as the temperature is high, the quantity likely to be released by any disturbances capable of producing condensation will also be greater in a similar proportion. Moreover, the dispersion upwards, over the heated continent, of the air that flows in from the south, conduces to the increase of the quantity of vapour in the upper parts of the atmosphere, and to the maintenance of a state of unstable equilibrium in which moderate local disturbances of temperature are likely to cause condensation and produce rain.

The fall of temperature which follows the commencement of the rainy season is first, no doubt, an effect of the fall of rain, which brings to the surface of the earth the water condensed in the much cooler higher strata; but the loss of heat is continued afterwards, in consequence of the sun's movement southward, and the disposition to condensation is maintained as long as the southerly winds blow. As the change from the southerly to the northerly monsoon is concurrent with the rapid fall of temperature which begins in northern India about the end of September, the close of the rainy season, like its commencement, is commonly marked by heavy falls of rain; the one caused by the first overthrow of the equilibrium of the vapour unstably suspended in the highly heated air at the solstice, and the other by the direct loss of heat which is experienced after the equinox.

The summer rains make their first appearance on the southern parts of the west coast in April, where the southerly winds have then become established. The region of greatest heat is now to be found at the northern part of the peninsula, the winds at Bombay not yet blowing from a point south of west. By the middle of June, as the area of greatest heat has advanced northward, and the winds have drawn well to the southward in the Indian seas, the rains begin to fall at Bombay, about which time also they become established at Calcutta.

The fall on the west coast is very abundant. The scarp of the table-land, or Western Ghâts, which forms an almost continuous obstacle in the path of the south-west winds, gives rise to great condensation, from causes already explained, the result being excessively heavy falls of rain along the face of the mountains exposed to the sea, and on the country between them and the sea, on the more exposed parts of the former the quantity measured reaching more than 250 inches, and on the latter from 100 to 120 inches. To leeward of this line of elevation the rain very rapidly diminishes, so that the quantity measured at Poona, 60 miles from the coast, is only 25 inches. Manifestly, after any great quantity of rain has been once condensed from the south-west winds, there remains relatively little to supply the districts to leeward; and if, as is here the case, the obstructing range of heights is considerably more elevated than the surface of the table-land, probability of further condensation after the wind passes that range is much reduced. The ridge, however, in fact, is a good deal broken in its outline, and openings occur at intervals through which more or less vapour passes, and aid in supplying rain to the table-land.

The gradual extinction of the very heavy rainfall of the Malabar coast as we approach Cape Comorin, near which we have less than 30 inches, and the corresponding diminution at the northern extremity of the coast, are readily explained by the smaller amount of disturbance caused by the more broken character of the mountain ranges, and by the air being able to pass round the end of the barrier instead of being forced over it. The fact that during this season the rain only extends 40 or 50 miles from the coast out to sea plainly depends on a similar cause.

Following the coast westward, we find that though the south-west winds blow with great force and regularity over the coast, at the mouth of the Indus and in Sindh the fall of rain is very small and irregular. For here this wind meets with no such obstruction as that of the line of Western Ghâts. On the contrary, the air passes from a comparatively cool sea surface, over a very hot surface of low land, and any tendency to condensation that might be caused by the slight rise over the land, is more than compensated by the increased temperature.

The current, therefore, passes on as a southerly wind, carrying with it the uncondensed vapour over Sindh, to be at length precipitated on the outer ranges of the Himalaya in the Punjab, or on the mountains of eastern Afghanistan. There is no room to doubt, that had a range of mountains, such as the Western Ghâts, connected the high land of the Indian peninsula with that

of Baluchistan, the whole of the Punjab must have been, what the country that lies between it and the sea is, almost entirely deprived of rain!

The importance of the great valleys of the Taptee and Nerbudda, in connection with the rainfall of Central India, will now be apparent. Up these openings the south-west winds pour their vapour-bearing streams, and furnish to a large area in the heart of the peninsula the rain which is precipitated by the atmospheric disturbances that occur around the high lands in the centre of the table-land. This diversion of the vapour-bearing currents aids, no doubt, in producing the diminished fall of rain observed in the northern coast districts around Guzerat, as compared to those near Bombay and farther south, and serves to explain the increased fall of between 40 and 50 inches in Central India, as compared to that, between 20 and 30 inches, in the Deccan.

The south-west winds of the west coast do not, properly speaking, extend across the peninsula. On the Madras coast, during the south-west monsoon, the land and sea breezes continue to be strongly marked, whereas on the west coast they disappear, and the rainfall between May and September over the southern and eastern portion of the peninsula is relatively small.

On the opposite coast of the Bay of Bengal, and along the Malay peninsula, excessively heavy rain is the rule during this season, the quantity being from 100 to 200 inches. Here, too, a continuous line of mountain follows the coast facing the prevailing winds. On reaching the straits of Malacca, and passing under the lee of the island of Sumatra, the rain diminishes greatly; and at Singapore, at the point of the peninsula, the months between April and September are decidedly the least rainy half of the year, the largest fall taking place in the north-east monsoon, when the winds reach Singapore blowing directly from over the sea.

Phenomena exactly similar to those observed on the Western Ghâts occur on the mountains east of Bengal. At Chirra Punji, on the Khasiya hills, which rise abruptly to about 4,000 or 5,000 feet over the delta of the Ganges, the rainfall is believed to exceed that known at any other place on the earth, more than 600 inches being a not unusual annual amount.

The difference between Bengal, with a rainfall of from 60 to 70 inches, and Sindh, with hardly any, is very remarkable. It is sufficiently explained by the distribution of the high land that is contiguous to the former, and, indeed, almost surrounds it. The great mountains on the north communicate with the ranges on the east which separate Bengal from the upper parts of Burmah, and form a serious obstacle to atmospheric movements in that direction. These ranges are all well clothed with forest, and the temperature of the whole area over which they extend must be considerably lower than that of the country to the west of them. This is accompanied by a higher barometrical pressure, which leads to the development of easterly winds during the summer months blowing from Eastern Bengal to the far hotter regions of north-western India, where the barometric pressure is least. From these causes, the rains begin much earlier in Assam and its neighbourhood than in any other part of India, *viz.*, in April, soon after the southerly winds are established at the head of the Bay of Bengal; and a tendency towards such early rains is discernible in all the Bengal registers. Thus the conditions are very different from those of Sindh, the free onward progress of the winds being arrested in Bengal by the current set up towards the north-west, and the influx of relatively cool air from the east preventing any tendency to a rise of temperature in the air coming up from the Bay of Bengal as it passes over the land, such as would stand in the way of local condensation.

The rainy season rapidly develops itself from Bengal towards the north-west, the fall gradually decreasing in amount as the rain-bearing winds pass on; a fact readily explained by the consideration, that as the condensation of the vapour goes on, less remains to supply the more distant localities.

Concurrently, with the reduction of the rainfall in passing from east to west in northern India, we find an increase in the quantity as we approach the Himalaya, and a diminution as we recede from the range, the gradation being distinctly marked, from a distance of 150 or 200 miles to the foot of the mountains. On the outer slopes of the Himalaya the fall is very greatly increased, but it rapidly diminishes again in amount as we penetrate among the mountains.

These results are brought about in a manner that deserves particular attention. At all times of the year winds blow up the valleys of the Himalaya towards the

highest parts of the chain, and down them at night; the day winds having their greatest force at the high passes into Tibet, and the night winds at the debouches of the great rivers into the plains. Such winds are well known to be characteristic of all mountain ranges. They are no doubt due to the disturbance of the planes of atmospheric equilibrium, caused by the alternations of temperature in the air over the mountains and low lands. A column of air over the low land, measured from any horizontal plane of equilibrium, being longer, will expand more and contract more; one over the mountain, being shorter, will expand and contract less. As the day advances, and the heat increases, the planes of equal pressure will all rise over the low land, and the air will flow towards the axis of the elevation; as the night comes on, and the temperature falls, the greater contraction of the longer columns over the low land will bend the planes of equal pressure from the axis of elevation outwards, and the air will move in that direction.

Thus a system of aspiration is established over the mountains, by which the vapour-charged air that comes up from the sea is drawn up from the plains along the valleys and over the outer ranges, and is so brought under the operation of that sort of action which we have already seen to be so efficacious in producing condensation. These movements serve also to explain what seems peculiar in the gradation of the rainfall within and without the mountains. It is, I think, also to the same cause that we may trace the circumstance, that the first heavy falls of rain in upper India take place on the mountains, and that the disturbances are thence developed and extended which lead to a general fall over the plains.

In northern India the summer rains usually cease before the end of September; in Bengal and along the Arracan coast they are prolonged into October. In western and central India also a little rain falls in October. Over all this area northerly winds are commonly established in October, and the rain that falls at this time must be regarded as the residual condensation under the increasing cold of autumn of the vapour previously brought up by the southerly winds.

With the fall of temperature in September, the region of least pressure is rapidly transferred to the south, and the northerly winds begin first in the north and gradually extend southward; though the southerly winds still continue to blow at the end of the peninsula till November. These changes lead to the establishment of a current of air from the Bay of Bengal, blowing as a north-easterly wind towards the Madras coast, along which there is, in consequence, set up an autumn season of heavy rain lasting from October to December, quite analogous in its efficient causes to the summer rainy season of the western coast. This rain usually extends from about the great bend in the east coast to Ceylon, though its influence is at times felt as far north as Cuttack; and it is of essential importance to all the eastern border of southern India, which, as was before explained, receives but a scanty supply during the south-west monsoon.

It may here be noticed that the cyclones that originate in the Bay of Bengal in October and November appear to be results of atmospheric movements and condensation developed over an area of low pressure that remains in the bay, after a high pressure area has begun to form rapidly over Eastern Bengal, with the fall of temperature accompanying the close of the year; and that the tendency to the formation of cyclonic movements is to be seen in the north-easterly winds that usually prevail in the north and west of the bay, while south-westerly winds are still blowing in the southern and eastern parts. The cyclones of May and June appear to originate further south, and to depend on some manner still imperfectly explained on the arrival of the winds highly charged with vapour which begin to blow strongly at that season.

The map which is before you resumes the facts into which I have been entering in some detail. It shows that the part of India east of the 80th meridian has an average yearly rainfall for the most part exceeding 40 inches, and that, excepting the country between the Western Ghâts and the sea, the portion west of that meridian has a smaller rainfall. Further, we see that the quantity is extremely small all over Sindh, and that the tract in which the fall is less than 30 inches includes all the Punjab excepting the mountain districts, a considerable part of the North-Western Provinces extending to half-way between Agra and Allahabad, a large part of Rajpootana and Kattywar. Again, we observe a large area in the peninsula, occupying nearly the whole of

the Deccan and Mysore, on which also the rainfall is less than 30 inches.

Of the area in which the rainfall is below 15 or 20 inches, it may be said in general terms that agriculture is not there possible otherwise than with artificial irrigation; and thus it has happened that the population of the districts where the rain is of all others least abundant, have made themselves in a very great degree independent of the local rainfall. On the other hand, it may also be said that where the average rainfall exceeds 40 or 50 inches, the occurrence of such drought as will cause serious scarcity is rare, though when it does occur it may be very severe. It was in a portion of this area that the Bengal famine of 1873 took place, and also that of Orissa in 1866.

The region, the average rainfall of which is between 25 and 35 inches, is probably that which suffers most from droughts. Here, although on the average the supply of rain is sufficient to support an agricultural population, the fluctuations which reduce the fall below what is essential are so frequent, as to lead to repeated seasons of scarcity of greater or less severity. The north-western part of the North-West Provinces, the north-western part of Rajputana, and the Deccan, with a small part of the Madras districts at the end of the peninsula, fall within this category. The present scarcity affects the whole of the dry region of the peninsula. The drought of 1837-38 was extremely severe in the North-West Provinces, as also was that of 1860. In Rajputana a very severe scarcity, followed by great destruction of life, occurred in 1868.

For reasons already suggested, the results of drought have a tendency to be more fatal where the average rainfall is abundant, than where it is scanty. In the latter case, the population is less likely to be dense, and better able by its habits to go in search of subsistence elsewhere, and by its sparseness to succeed in procuring it. A more dense population will be less easily provided for; and in proportion as experience of drought is small, skill in devising means of resisting its effects will be small also, when once present resources are exhausted. Drought also will be more or less fatal, according as it follows a season of bad or good rainfall; and it has commonly happened that severe famines have been caused by a severe drought following one or two years of indifferent rain. The stocks of food become exhausted, and the cattle and the population enfeebled, and thus less able to resist the pressure put on them.

In a country where there is no pasture like India, the feeding of the agricultural cattle is always a difficulty, and their condition is commonly extremely poor, viewed in relation to the standard of temperate countries. The effect of drought in the destruction of the cattle is one of its surest and most pernicious evil consequences.

It will be apparent that the importance of the fall of rain in India, for general purposes of agriculture, will be determined by the requirements of the principal crops, and particularly on those crops on which the food supply of the people depends.

The people of India subsist for the most part on vegetable food, cereal grains, pulses, and vegetables, with milk and butter. Other animal food, excepting on the coasts where fish is procurable, is comparatively little eaten, even among the Mussulmans, who form about one-tenth of the population. The grain crops, therefore, are of unusually great importance. The grains most commonly consumed in three-fourths of India are millets, called in the Hindoo dialects, jowar and bajra. Rice is the ordinary food of the people of those regions only where the conditions of climate are suitable for the abundant production of this grain. This would include Bengal, the coast and southern districts of Madras, and the western districts of Bombay, as well as British Burmah. Contrary to what is commonly thought to be the case, the rice-eating population of India is altogether in a minority.

These food-grains, and some others which I need not mention specially, are plants suited to tropical conditions of climate, and they are all raised in the summer or hot half of the year, the crop of which season is known in most parts of India as the khureef. There is, however, a second crop, more particularly characteristic of the parts of India which have the coldest winter, which is on the ground during the winter months, and is called rubbee.

The khureef is usually sown as soon as the rainfall admits of the ploughing of the land, and it is reaped in September or October. The rice crop varies somewhat in its time of sowing and of ripening according to locality and variety. The chief harvest in Bengal is in December; on the Madras coast, farther south, the

later rains lead to a still later harvest, where there is but one; but the more tropical climate of the south admits an almost indefinite succession of crops wherever an artificial water-supply is available to raise them.

It need perhaps hardly be said that most varieties of rice require a large quantity of water to raise them; and aid in some shape or other is given by artificial means in most parts of India to the natural rain-supply, to ensure the safety of this crop. Particularly in the south of India, multitudes of reservoirs have been constructed with this object, in which as large a supply of rain-water is collected as is practicable, to supplement the direct fall. Larger irrigation works have been carried out by the British Government, to divert, with a similar object, the waters of most of the rivers that discharge themselves on the east coast.

The grains, called jowar and bajra, are commonly sown on the higher lands, and left to depend entirely on the natural rainfall. Their requirements in the way of water are very much less than those of rice, and it is very unusual to supply them with artificial irrigation.

The rubbee crop is usually sown in October, and ripens in March or April. In the north of India it consists chiefly of wheat and barley, which grains, however, hardly enter into the ordinary food of the agricultural population, being reserved for the better-to-do classes and town population. Certain pulses that are largely used for food also are raised at this season. Excepting on the high lands of Central India and the Deccan, wheat does not thrive much south of the tropic; and in the southern parts of the peninsula the reduction of temperature in the winter months is hardly sufficient to develop any distinctly temperate agriculture, such as forms a very marked feature of northern India.

Great irrigation works exist also in several provinces of northern India. These probably afford more aid to the rubbee than to the khureef harvest; and their chief importance in connection with the food supply of the country is without doubt due to the security which they give to the wheat and barley harvests, though their general utility in adding to agricultural produce of all descriptions is very great.

In considering the more special requirements of agriculture in the matter of rain, and the precise manner in which a partial failure is likely to be mischievous or otherwise, the critical times have to be distinguished. First, as the great power of the tropical sun utterly dries up the soil in the hot months that precede the rainy season, the first showers are almost essential to admit of the final ploughing, and the sowing may thus be unduly late in unfavourable seasons. Where artificial irrigation is available, this delay is avoided. Next, the thorough saturation of the soil, and its maintenance in a sufficient state of moisture, are requisite for the germination of the seed, and this is always one of the most critical periods for every crop. In many cases thoroughly favourable rain at this stage will secure a return of some sort, even in an otherwise very bad season; and a bad commencement may often be beyond remedy, however good the subsequent falls may turn out. The next critical stage is that of flowering, when a great access of rain may be almost as fatal as a want of it, by causing the destruction of the parts of the flower essential for the development of the grain. The period immediately follows in which the grain is fertilized and takes its ultimate form, during which the supply of moisture to the plant is not less essential than in the first stage of its life, and any serious failure of rain is fatal to the harvest. Thus, even though the average fall in any year may be fully enough to carry on the ordinary processes of growth, the failure of rain even for a few days at one of the critical periods may lead to a complete loss. The drought of 1873 in northern Bengal arose from the failure of the later rains alone. The troubles of the present time seem to be due to a general failure, both of the south-west monsoon rains on the west coast, and of those of the succeeding north-east monsoon on the east coast; a combination of evil fortune which, it will be seen, necessarily falls with the greatest weight upon the southern districts of Madras.

In attempting to give any general account of the phenomena of Indian rainfall, it has of course been necessary for me to deal with average quantities. But the departures from these averages in separate years are very great; and it is from the fluctuations that thus occur, that the areas of average small and large rainfall may be transformed, without any considerable

derangement of the general sequence of phenomena that I have described, into areas of abundance or absolute drought. Thus the well-marked loops that are formed by lines of equal rainfall having their points directed to the eastward, and following generally the line of the Jumna and Ganges from the Punjab to Bengal, indicate the probability, which is supported by actual experience, of areas of drought being formed along this axial line. I apprehend that the Bengal drought of 1873, which affected, though with less intensity, the adjacent districts of the north-west provinces along the Ganges, may be regarded as due to the local exaggeration of the general causes that lead to the peculiar inflexion of the lines of rainfall to which I have alluded.

The great extent of the fluctuations of the rainfall will be shown by the following figures. The Madras average for sixty-four years is 48.5 inches, the greatest excess over the average being 39.9 inches, and the greatest defect below it 30.1 inches. At Calcutta, for forty-seven years, the average is 65.8 inches, with a maximum excess of 27.5 inches, and a defect of 22.2 inches. At Bombay, for fifty-two years the average between May and October being 76.9 inches, the maximum excess was 42.0 inches, and the defect 41.8 inches. At the three places, the average deviation of a single year from the mean of all is found to be, for Madras 12.4 inches, for Calcutta 9.0 inches, and for Bombay 13.4 inches.

No precise physical connection has hitherto been established between the local rainfall at any place in India, and the temperature or pressure of the surrounding area; and no certain step has yet been made, so far as I know, towards foretelling the character of the seasons. In these respects, however, our knowledge is not less as regards India, than other countries.

An opinion has, indeed, been quite recently published by Dr. Hunter, to the effect that the rainfall registers at Madras, which extend over sixty-four years, supply evidence of a connection between the quantity of rain and the sun-spot cycles of eleven years or thereabouts. This idea is not novel, having been advanced some years ago by Mr. Meldrum and others, on the alleged basis of facts collected from many different parts of the globe.

So far as Dr. Hunter's views are concerned, I have no hesitation in stating my own conviction, that the facts on which he relies do not support his conclusions. He has inferred, from what must be held to be altogether insufficient numerical data, that sure indications of periodicity exist. He arrives, by an arithmetical process, at certain figures, which he regards as the probable mean amount of rainfall in the successive years of the eleven-year cycle, and finding a maximum and minimum among them, he infers that this is a proof of a true periodical variation. But such a result alone proves nothing. To test its value it is necessary to compare the calculated quantities of rain for the several years with the quantities actually observed, and then to consider whether the differences are of a character to justify the belief that the calculated quantities afford a reliable approximation to the truth, and what sort of approximation. Dr. Hunter does not seem to have been aware of the necessity for exercising this caution, though the extreme variation of the rainfall from year to year, to which reference has already been made, would appear to have been likely to suggest it. The only conclusion that seems possible, from such an examination of the figures as I have described, is the negative one, that they cannot be accepted as supplying any evidence in support of the views put forward by Dr. Hunter.

Though this argument is mainly negative, and goes rather to discredit the alleged proof of Dr. Hunter's conclusion, than the conclusion itself, yet much doubt appears to me to be thrown on the probability of any such direct connection between the rainfall at Madras and the sun-spot period as has been spoken of, by a comparison of the Madras observations with those made during the same period at Calcutta and Bombay. It is extremely difficult to conceive, that if such a connection existed at Madras, it should not be apparent at the other two places; yet the same treatment applied to the Calcutta and Bombay figures as that adopted for Madras shows no correspondence in the results. Neither can any persistent relation be seen to exist between the quantities of rainfall at the three places. There is an occasional likeness at one time between one pair, at another between a second, and again between the third, but no uniformity. And this is what might have been expected, from what we know of the general manner in which precipitations of rain take

place, and the oscillations of wet and dry weather occur.*

On the whole, our knowledge of the immediate physical causes of rainfall is very rudimentary; and though there be no present appearance of success in solving the intricate problems that an inquiry into those causes must involve, it can only be by help of a careful examination in detail of all the facts that it can become possible at all. Such a collection of facts has at length been seriously commenced; but what I have already said will indicate the great complexity of this subject, and the many difficulties that will have to be encountered in grasping it in a satisfactory way.

Such being the general position of India in respect to the rainfall necessary for its agriculture and its food supply, and man having no possible means of exercising any control over the atmospheric changes which are effective in adding to or reducing the quantity of rain, and having no present power of foreseeing these changes, it may be asked whether we therefore have no hope of escaping from the terrible consequences of drought. In my opinion there can be no doubt of the possibility of combating successfully its worst results by the progress of civilization; by which I mean, that improved social condition in which the accumulated knowledge and material resources of a community are applied in the most effectual way to meet its requirements. The result at which we aim in India can be brought about by this, and this alone; as this, and this alone, has been able to bring it about in other countries. But as such progress is necessarily slow, we must be content for the present to pass through a condition of periodical suffering of an acute kind, during which the bitter lessons of experience will continue to urge improvement; and thereby intelligence will be stimulated, and ways of escape from these evils will be gradually perfected. These ways of escape are indeed already sufficiently evident, and so far as they have been hitherto applied, have been found to be thoroughly efficacious. They are the provision of artificial irrigation, and of improved means of transport; the first, to give a certain supply of water for the purposes of agriculture, increasing production generally, and supplementing the rainfall so as to prevent calamitous drought; and the second to provide facilities for the economical distribution of food, and for the operations of commerce, by which wealth is increased. Simple as these remedies may appear, the material difficulties in the way of their being furnished to the extent necessary to remove the evils now under consideration, cannot at present be surmounted. They require the application of capital, that is to say, the accumulated results of labour, which, to meet the requirements of the present case, may possibly still have to be prolonged over very many years. For India must perforce supply her own needs from her own material resources. Nowhere, nor at any time, has the benevolence of others succeeded in removing the

burden imposed on every community of providing for its own existence under pain of extinction. Even if it were possible that external aid could be given on an adequate scale to supply the requisite material appliances, it is certain that the moral qualities would not have been developed, by which alone those appliances could be successfully made use of—self-reliance, and, what this quality makes possible, self-sacrifice.

And if the people of India have on the one hand specially heavy burdens to bear in resisting these and other destructive forces of nature arising from their climate, which will certainly tax their strength to the utmost, yet on the other they find ready to their hands unusual aid in the great reproductive powers of their soil, also due to the same cause. Neither can we estimate as of small value to them, the wealth, the knowledge, and the practical skill in all the arts of life, possessed by their British rulers, and so largely employed to their advantage. But that the task will in any case be a very heavy and tedious one to be got through, no one can doubt, who has passed a large part of his life, as I have done, in seeking for the means of extending those essential material allies in the battle of Indian life—irrigation works and railways.

True humanity assuredly demands of all Englishmen their co-operation in what will really conduce to the mitigation of the calamities caused by Indian droughts. But it is certain that there is only one possible mode of escape, namely through labour. The fruits of industry in years of plenty must be made to meet the want in years of scarcity; and relief is to be obtained by means of the combined and continued exertions of the localities immediately concerned, and no longer by relying on assistance to be supplied from without. There is no escape from the conclusion that the conditions of their existence impose on the people of India severe suffering and periodic partial destruction, if they submit to these conditions unresisting; severe toil, and persistent intelligent effort, if they are to escape their extreme consequences. The Government and the people must everywhere have this practically enforced upon them, and until it is done the movement will not have fairly set in the right direction. Experience in India leads to exactly the same conclusions as those arrived at elsewhere, that a system of public relief in time of distress, not guarded by the sense of specific local financial responsibility, is a source of grievous abuse, misery, and demoralization; and it is my earnest hope that no temporary impulse of sympathy with present suffering, no selfish (if I may be allowed so to apply the term), no selfish effort to escape at any cost the pain of witnessing it, may be permitted to stand in the way of that real benevolence which is founded on sound principles drawn by dispassionate intelligence from the lessons of experience, principles which I am glad to believe have been adopted by the highest authorities concerned in the government of India.

NOTE ON THE RAINFALL OF INDIA, BY MR. H. F. BLANFORD, METEOROLOGICAL REPORTER TO THE GOVERNMENT OF INDIA.

In its origin the rainfall of India is derived exclusively from the evaporation of the Indian Ocean and the two great gulfs which bathe the coasts of the peninsula. A secondary source of supply is the re-evaporation of the fallen rain from the wet land surface, and also from rivers, tanks, marshes, irrigated tracts, and the vegetation; but this becomes of importance only at that season when the direct supply from the ocean is most abundant. The products of re-evaporation are carried forward by the same winds which bring the main vapour-supply from the ocean, and they operate, therefore, only in adding somewhat to the total precipitation and extending the area over which this is discharged. Certainly it is a practical question of high importance, in what measure vegetation, and more especially forest vegetation, thus adds to the total rainfall of the country. But the discussion may be advantageously deferred for the present, since the beneficial action of forests, regarded as a source of vapour, is of less importance than that which they exert as regulators of the subsoil storage, and it will be convenient at a later period to consider their action as a whole. In treating of the

agencies by which vapour is conveyed and discharged over the land, it is unnecessary to distinguish between original and secondary sources of supply.

By far the greater part of the rainfall of India is brought direct from the ocean between the months of June and October by the regular periodic wind known as the south-west, or, as I prefer to call it, the summer monsoon. The primary cause of this current is now known to be the high temperature which is acquired by the land surface of India itself, and more especially of Northern India,† during the three months that precede the summer solstice. Under the continued and increasing radiation of the spring sun traversing a comparatively cloudless sky, the lower strata of the air in contact with the ground gradually acquire a temperature greatly above that of the seas that bathe the shores of the peninsula, and, being expanded, lift the superincumbent strata which flow away in the higher regions, as a consequence of which the diminished mass presses with less and less weight on the land surface. It is only by slow degrees that an excessive temperature is imparted from the lower to the higher strata; and on an average it is not, therefore, until a

* See, for further development of the Author's views, his paper in the Proceedings of the Royal Society, pp. 249-261, May 1877.

† Not, as was formerly supposed, that of Central Asia.

week or two before the summer solstice that the pressure is sufficiently reduced to set in motion that steady current of air from the ocean which I have spoken of as the summer monsoon. This reaches India in two main branches. That from the Arabian Gulf strikes the coast of the peninsula from a direction about west-south-west, and, meeting the mural barrier of the Western Ghâts, discharges an excessive amount of rain on the western face of that range and the narrow belt of low country (the Konkan and Malabar) at its foot. The current, thus partially exhausted, surmounts the crest of the range, and continues its course across the peninsula, bringing a much diminished, indeed a comparatively scanty, rainfall to the plateaux of the Deccan and Mysore, and only occasional showers to the eastern fringing plain of the Carnatic. But in the northern part of the peninsula, where the valleys of the Tapti and Nerbudda offer freer access to the interior, and where the current impinges on the broken east and west ranges of the Satpuras, the discharge is more copious; and it brings a large proportion of the rain falling on the Central Provinces, Orissa, and the plateaux of Malwa and Bandelkhand, which extend north of the Satpura range to the confines of the Ganges valley. In the northern part of the Bombay Presidency, viz., Guzerat and Kattywar, in Rajputana and Sind, its influence is less felt. The high temperature of these more arid tracts is unfavourable to precipitation, and the strictly marine wind is frequently interrupted by, and intermingled with, more westerly currents, which blow from the dry plain of the Mekran coast and the hills of Beluchistan.

The other branch of the summer monsoon sweeps the Bay of Bengal on a south-west course, impinging full in the face of the coast ranges of Arakan and Burma, where the rainfall is as heavy as on the western coast of India, and also the hills of Eastern Bengal and Assam, the plains of Cachar and Sylhet. The trend of the Madras coast being almost north and south, while the general direction of the current is from the south-west, the plains of the Carnatic are almost completely excluded from its influence; but north of the Godavery mouth, where the coast-line changes its course to north-east, a certain indraught takes place, and it contributes a certain amount of rain to the narrow plain of the Northern Circars and Orissa, as well as to the hills of this portion of the Eastern Ghâts. The remainder of the current reaching the shores of the Gangetic delta is diverted to north and north-west, blows across the plateau of Western Bengal and up the Gangetic plain, and brings a tolerably copious, but steadily diminishing, rainfall to the upper part of the Ganges valley, and even to the Punjab beyond. On the north of the valley it meets the outer slopes of the Himalaya, which determine a heavy precipitation of the vapour; and the influence of this obstacle extends far into the plains, since the line of minimum rainfall coincides approximately with the main stream of the Ganges. In the Punjab, indeed, the belt of plain country over which the rainfall thus brought by easterly winds is sufficient to admit of agriculture does not exceed 100 to 150 miles in breadth, and terminates against the desert tracts of Bikanir and the arid doabs of the Punjab rivers.

It has been mentioned above that, owing to their position under the lee of the highlands of the peninsula, the plains of the Carnatic receive only occasional showers during the prevalence of the summer monsoon. But in October, when the strength of this current towards the head of the Bay of Bengal slackens in consequence of the falling temperature and rising pressure of Upper India, and when the rains of the Punjab and of the Upper Gangetic valley are virtually at an end, the high temperature and consequently low pressure of the Carnatic are sufficient in average years to cause a recurvature of the current towards this province, producing the autumn rains which are characteristic of the Madras Presidency, and are indeed those on which the cultivators chiefly rely for filling the tanks on which so much of the local cultivation depends. The retreat of the summer monsoon from the Upper Provinces and its recurvature towards the Carnatic takes place gradually. In September the wind becomes easterly in Bengal, and after the end of the month but little rain reaches the Punjab and Upper Provinces. In October the winds are variable, but tending to become northerly in Northern India generally; but in the peninsula they are more or less easterly, and, coming from the Bay of Bengal, carry a certain amount of rain to the Deccan, more to the southern than to the northern districts. Thus, while the former receive on an average from $1\frac{1}{2}$ to 4 inches,

the latter and Mysore receive from $3\frac{1}{2}$ to 6 inches. On the east coast of the peninsula, False Point registers $12\frac{1}{2}$ inches, Vizagapatam about the same, and Madras nearly 11 inches. In November, however, while False Point has less than 3 inches and Vizagapatam less than 2, Madras has more than 13 inches, and Jaffna, at the north extremity of Ceylon, $15\frac{1}{2}$ inches. There is, however, at this season a regularly recurring tendency to the formation of another region of low atmospheric pressure over the bay in the neighbourhood of the Andaman Islands. This depression acts as an antagonistic influence to that of the Carnatic, and indeed of the peninsula generally. It is the chief cradle of the disastrous cyclonic storms which characterise the Bay of Bengal at this season; and in some years, when, owing to independent causes, the pressure of the Carnatic is relatively higher than usual, the vapour which might otherwise be expended on the plains of Madras is here condensed and precipitated in unusual abundance, and the easterly and northerly winds generally prevailing in the Carnatic at this season are replaced by a more northerly current coming from the land surface of the peninsula itself. Such was notably the case in 1876. Under such circumstances there is a failure of the Madras rains. In good years the Madras rains continue for about two months, viz., to the middle of December, by which time the north-east or winter monsoon has established itself over the bay, bringing fine, clear, and comparatively cool weather.

Meanwhile, in Upper India, the Punjab and North-Western Provinces, the cessation of the summer rains is followed by a rapid fall of temperature under cloudless skies. A cool dry gentle current sets in from the north-west, flowing down the Ganges valley towards Bengal, and from the north across the plateau of Bandelkhand to the Satpuras, south of which it becomes easterly, and sets towards the Bombay coast. Still further south it partly coalesces with easterly winds from the recurring and expiring monsoon of the Bay of Bengal; so that, as has been already mentioned, the plateaux of the South Mahratta Country, Hyderabad, and Mysore receive a certain small amount of rain in October, and sometimes even later. In Lower and Eastern Bengal also, and on the Arakan coast, a few inches of rain are expected in October, and are important for filling out the ear of the later rain-crops, and for the sowing and germination of the cold-weather crops. But the latter part of October and November and the first part of December in Northern India are generally rainless; and the winter rains, which may be considered as recurring regularly only in Upper India, rarely set in much before Christmas, and are sometimes deferred till January.

These winter rains are brought to the Upper Provinces by winds having locally the same general direction as the summer monsoon, that is to say, east and south-east. But on the hills to the north of the Gangetic plain, the wind which brings up the clouds is generally more southerly, and even south-west; and a precipitation of snow takes place with northerly or north-westerly winds, which are probably only the local course of the air circulating around a barometric minimum. On the hills, indeed, after November this south-westerly wind is most prevalent, and appears to be the winter anti-monsoon—the return current which blows above the northerly winds, and occasionally descends to the earth's surface in latitudes lower than tropics. It is essentially a warm and damp wind, as felt in Northern India; and, when it blows from the sea, reaches the Upper Provinces charged with moisture, which is precipitated in the winter rains of the plains and the snows of the mountain tract. The barometer falls on its approach, and rises again rapidly when it is displaced by a westerly wind. In the Punjab, the North-Western Provinces, Central India, and Rajputana, the winter rains, though small in quantity, are of high importance to agriculture. They are second in importance only to the late September rains; the latter being essential to the germination of the winter wheat crops, and the former for filling the ear after the formation of the seed. In Lower Bengal they are less regular, and hence the cultivation, being of a different character, is less dependent on them; while in the peninsula generally, excepting some parts of the Central Provinces, they are all but unknown. The winter rains of the Upper Provinces are gentle and not very copious, unaccompanied by stormy winds. But they pass by insensible degrees into the spring rains, which have a wider distribution, and are generally accompanied by vivid electrical phenomena—strong gusts of wind and frequently hail. Hence they are often rather destructive

than beneficial. The vapour is furnished by the winds which set in on the coast as early as February, or even January, and penetrate by degrees further and further into the country, where, meeting the dry westerly winds from the interior, they form eddies, especially in the evening hours, causing a heavy precipitation, which is generally of short duration. These storms are most frequent, and bring the heaviest rainfall, in Lower Bengal and the low plains on the west coast of the Bay of Bengal. But they extend inland throughout the Gangetic plain and into the Central Provinces, as far as Nagpur. On the northern part of Deccan plateaux, in the Bombay Presidency, excepting in the immediate neighbourhood of the Ghâts, in Berar, and on the Bombay coast, they very rarely occur; the whole interval from October to June being practically rainless, and after March or April the storms of the Punjab, Sind, and Rajputana have the character of violent, but short-lived, dust-storms, with little or no rain.

Hence, with respect to periodic distribution, the fall of rain in the different parts of India may be summarised as follows. From June to September rain, more or less heavy and frequent, falls over the entire area, excepting indeed on the dry plains around the Lower Indus (Sind and Bikaner), where it is always very scanty, and occasionally fails together; while around the borders of this region (a part of the Punjab and Western Rajputana), and also in the Carnatic, it is restricted to occasional showers. In October, when the summer rains have ceased in Upper India and are coming to an end in Bengal, Assam, the Arakan coast, and the greater part of the peninsula, the heavy rainfall of Madras sets in, and continues till the middle or latter end of December. A little later than this begin the light winter rains of Upper India, which are most abundant in the Punjab, but extend occasionally down to Lower Bengal and the Central Provinces. These fall at intervals till the end of March or beginning of April in the Upper Provinces, after which another dry period sets in, lasting till the end of June. But in Lower Bengal, Assam, and Orissa the falls of rain become more frequent and copious from January onwards, having the character of afternoon-storms chiefly. The rains become heavy and continuous in Assam and Cachar some weeks earlier than in Bengal, and in Bengal and Bombay a fortnight or three weeks earlier than in the Upper Provinces. On the coast of Malabar also they are a week or ten days earlier than in Bombay. In Madras and the Carnatic generally, occasional showers are expected after February, but no steady rains till October. In the greater part of the Bombay Presidency rain is rare between October and June.

The normal distribution of the rainfall in respect of quantity is illustrated in the accompanying chart, originally drawn up for the use of the Forest Department. Two zones of excessive rainfall, varying from 70 to upwards of 200 inches (and in certain localities far exceeding even this),* characterise respectively the

line of the Western Ghâts and the outer slopes of the Himalaya with the hills of Eastern Bengal and Cachar and the coast ranges of Arakan and Burma. The latter belt includes nearly the whole of Assam, the plains of Cachar, Sylhet, and the eastern margin of the Gangetic delta, the coast plains of Arakan, and the delta of the Irrawadi. Over a much larger area the annual precipitation varies from 30 to 70 inches, viz., the remainder of Bengal, Orissa, the Gangetic plain as far west as Cawnpore; and, beyond this, a belt, diminishing from 100 to 50 or 60 miles in width, which skirts the base of the Himalaya up to the further extremity of the Punjab. It also includes the whole of the Central Provinces, the plateaux of Bandelkhand and Malwa, the eastern half of Hyderabad, the Eastern Ghâts, and the coast plain of the Carnatic down to Point Calimere, with a narrow belt on the summit of the Western Ghâts. The remainder of the peninsula has a rainfall of less than 30 inches, and in certain limited tracts as low as between 10 and 15 inches only. This dry region includes the eastern half of the Deccan plateaux and Hyderabad, Mysore, and the plains of Coimbatore and Madras. Another equally dry region to the north-west includes Kattywar, a large part of Western Rajputana, the North-Western Provinces around Agra and Delhi, and a belt of less than 100 miles wide in the North-Eastern Punjab; and finally the remainder of Rajputana, Sind, and the southern half of the Punjab has an average fall of less than 15—indeed, for the most part less than 10—inches.

The tracts more specially liable to severe famines are those where the average rainfall ranges between 15 and 60 inches. In the driest tracts, such cultivation as exists is carried on chiefly by means of irrigation from large perennial rivers, as in the Indus valley, or from deep wells; and these sources, though variable in yield, seldom fail completely. Moreover, the population is sparse, and in bad seasons is accustomed to obtain relief by resorting to extensive temporary emigration. On the other hand, where the normal rainfall exceeds 60 inches, the failure of the rains is seldom, if ever, so great as to give rise to general starvation; although, in the more thickly populated provinces, severe suffering, and increased mortality, is felt in bad years by the poorer classes, who live from hand to mouth, and in good years continue to propagate up to the limits of attainable existence. But those parts of the intermediate region in which the normal rainfall varies from 20 to 40 inches include some of the densest populations of India, and these are the seats of the most disastrous famines. The North-Western Provinces, Rajputana and Berar, Orissa, the Northern Circars, Khandesh, Hyderabad and Mysore, and the Carnatic,—all too familiar names in the famine literature of the present century,—are wholly or in great part included in the zone of intermediate rainfall; and it is when these are disastrously affected that the populations of the neighbouring still drier tracts suffer with equal severity.

The normal distribution of the rainfall in the different months of the year is shown in the following condensed table, which gives the averages of the different parts of India as obtained from 289 stations. The sub-divisions adopted and shown on the accompanying map are physical rather than administrative; but the form of the table allows of each division being readily referred to its place in an administrative classification. The detailed returns which have furnished the basis of the table are given in the Appendix to this Report.

* The following places afford instances:—

	Inches.
Cherrapoonjee in the Khasi hills -	485
Buxa Fort in the Bhutan Duars -	218
Sandaway on the Arakan coast -	218
Mahablieshwar on the Western Ghâts -	252
Matheran, an isolated hill near Bombay -	256
Bauru Fort on the Western Ghâts -	252

TABLE I.—TABLE OF AVERAGE MONTHLY AND ANNUAL RAINFALL IN DIFFERENT PARTS OF INDIA.

	Number of Stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
I.—Western Himalaya (Punjab and N.W. Provinces)	8	2.07	2.72	3.22	2.27	2.91	7.13	17.68	16.83	6.47	1.74	0.86	1.67	65.07
II.—Punjab plains (Punjab)	29	1.07	1.06	1.17	0.77	0.72	1.90	6.31	4.95	2.54	0.46	0.23	0.64	21.82
III.—Upper Gangetic plains (N.W. Provinces and Bengal)	50	0.83	0.71	0.51	0.31	0.93	4.78	11.43	9.36	7.04	1.71	0.05	0.34	38.00
IV.—Eastern Himalaya (Bengal)	4	0.65	0.57	1.42	6.06	12.10	33.39	32.98	26.40	23.70	8.86	0.19	0.16	144.49
V.—Lower Gangetic plains (Bengal)	22	0.57	1.04	1.49	3.11	6.33	12.80	13.37	12.43	10.23	5.25	0.42	0.16	67.20
VI.—Assam and Eastern Bengal (Assam and Bengal)	16	0.76	1.43	3.18	6.72	11.70	18.40	18.26	16.33	12.78	5.63	0.99	0.29	96.47
VII.—Western Bengal (Bengal)	10	0.67	0.92	0.97	1.52	2.54	9.19	12.22	12.13	9.10	5.74	0.69	0.23	55.92
VIII.—Central India and Nerbudda (India and Central Provinces)	12	0.57	0.51	0.26	0.19	0.37	5.79	16.00	11.93	7.20	1.12	0.12	0.24	44.30
IX.—Rajputana and Guzerat (India and Bombay)	16	0.09	0.25	0.11	0.12	0.62	3.81	10.81	9.58	5.47	0.99	0.15	0.24	32.24
X.—Sind and Cutch (Bombay)	10	0.32	0.25	0.25	0.17	0.16	0.72	2.69	2.71	1.07	0.21	0.10	0.14	8.79
XI.—Khandesh and Berar (Bombay and India)	7	0.55	0.14	0.21	0.15	0.35	5.96	6.75	7.03	5.40	1.98	0.31	0.38	29.21
XII.—Central Provinces (South), (Central Provinces)	15	0.63	0.51	0.39	0.57	0.94	8.55	15.24	11.34	8.41	1.80	0.24	0.27	49.09
XIII.—North Deccan plateaux (Bombay)	13	0.17	0.03	0.24	1.03	1.62	5.31	5.85	4.46	3.94	4.33	0.64	0.47	28.09
XIV.—Hyderabad and South Deccan (India and Madras)	5	0.19	0.11	0.47	0.88	2.49	2.62	3.58	4.55	5.18	3.94	0.91	0.27	25.50
XV.—Konkan and Ghâts (Bombay)	12	0.35	0.04	0.14	0.39	0.85	33.77	53.28	35.78	18.25	3.83	0.50	0.12	145.26
XVI.—Malabar and Ghâts (Madras)	7	0.45	0.34	0.67	3.02	7.67	33.53	31.62	15.62	5.61	7.67	2.49	1.63	111.77
XVII.—Carnatic (Madras)	28	0.58	0.46	0.41	1.23	2.65	1.76	2.45	3.32	4.51	7.15	5.93	2.91	33.88
XVIII.—Northern Circars (Madras)	10	0.34	0.37	0.64	0.83	2.37	4.25	5.25	5.65	7.27	8.04	1.26	0.29	35.16
XIX.—Arakan (British Burma)	3	0.19	0.12	0.26	1.66	12.78	45.58	51.14	41.82	23.94	11.23	3.77	0.14	192.85
XX.—Pegu (British Burma)	3	0.07	0.02	0.17	0.65	7.63	13.32	17.14	19.53	11.87	6.81	2.19	0.02	76.33
XXI.—Tenasserim (British Burma)	4	0.14	0.23	0.50	3.57	17.51	35.37	33.49	27.19	27.53	16.32	1.76	0.15	173.37
XXII.—Bay Islands	2	2.09	1.89	1.77	4.29	13.96	17.13	13.53	14.19	14.31	13.42	7.54	4.94	108.41

Variation of the rainfall.

It may be doubted whether in any single year the rainfall is ever very deficient or excessive over the whole of India. In 1876 an unusually large area was indeed affected by the drought. In the greater part of the Bombay and Madras Presidencies the rainfall was very deficient throughout the year; and in the North-Western Provinces and Assam the fall was below the average; but the Punjab, Bengal, and some part of the Central Provinces had a fair average fall, in some

places indeed more than the average; and such was also the case in the normally drier northern districts of the Bombay Presidency. The subject of the variation of the rainfall in different parts of India is now under investigation, and I am not prepared at present to enter on any exhaustive discussion of the facts. But the table following, which gives a summary of the registers for the Carnatic, the Deccan, the west coast of India and Ceylon, the Punjab, and the North-Western Provinces (exclusive of Oudh), will serve to illustrate the fact enunciated above.

TABLE II.
MEAN LOCAL VARIATION OF RAINFALL IN PAST YEARS.

PLACES.	Stations.	Normal average.	1863.	1864.	1865.	1866.	1867.	1868.	1869.
Carnatic - - - -	29	Inches. 33.34	- 0.05	- 3.72	- 4.22	- 3.27	-11.31	- 4.25	+ 0.18
Deccan - - - -	14	30.13	- 0.54	- 1.49	+ 0.06	- 1.94	+ 0.76	+ 1.47	+ 0.69
West Coast - - -	13	99.60	+15.00	- 1.51	+ 3.30	- 7.54	+ 1.24	- 0.18	+ 7.34
Punjab - - - -	29	21.66	+ 8.10	- 2.13	+ 3.99	- 1.74	- 2.03	- 6.07	+ 0.96
North-Western Provinces -	27	34.72	?	-10.90	- 1.26	- 3.24	+13.69	-12.04	+ 0.08
Bengal - - - -	21	67.52	+ 0.55	+ 5.64	+ 4.54	- 3.05	+ 6.25	+ 8.31	+ 1.31
			1870.	1871.	1872.	1873.	1874.	1875.	1876.
Carnatic - - - -	+ 4.83	+ 7.38	+14.04	+ 1.21	+ 9.00	- 4.33	-11.99	+ 9.00	+ 1.80
Deccan - - - -	+ 7.00	- 4.74	+ 1.05	- 2.80	+17.18	- 0.33	-13.26	+ 0.71	+13.84
West Coast - - -	- 3.19	- 9.23	- 5.73	- 5.87	+14.82	+ 1.56	-17.65	- 2.63	+53.83
Punjab - - - -	- 4.92	- 4.51	+ 2.82	-1.06	- 1.56	+ 7.39	- 0.02	+ 2.36	+ 3.32
North-Western Provinces -	+ 9.96	+12.41	+ 4.14	+ 1.65	+11.41	+ 4.51	- 4.18	-14.11	- 1.08
Bengal - - - -	- 3.97	+12.62	- 6.95	-21.89	- 3.97	- 9.62	+ 0.80	+ 5.19	+ 4.88

And in the following table the same results are given in the form of percentages of the mean rainfall of each province—

PLACES.	1863.	1864.	1865.	1866.	1867.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.
Carnatic - - -	0	- 11	- 13	- 10	- 34F	- 13	+ 1	+ 15	+ 22	+ 42	+ 4	+ 26	- 13	- 36F	+ 26	+ 6
Deccan - - -	- 2	- 5	0	- 6	+ 2	+ 5	+ 2	+ 23	- 16	+ 3	- 7	+ 57	- 1	- 41F	+ 2	+ 47
West Coast - -	+ 15	- 2	+ 3	- 8	+ 1	0	+ 7	- 3	- 9	- 6	- 6	+ 15	+ 2	- 18	- 3	+ 53
Punjab - - -	+ 37	- 10	+ 18	- 8	- 9	- 28S	+ 4	- 23	- 21	+ 13	- 5	- 7	+ 34	- 1	+ 11	+ 14
N.-W. Provinces -	?	- 31	- 4	- 9	+ 39	- 35S	+ 2	+ 29	+ 36	+ 12	+ 5	+ 33	+ 13	- 12	- 41S	- 3
Bengal - - -	+ 1	+ 8	+ 7	- 5	+ 10	+ 12	+ 2	- 6	+ 19	- 10	- 32S	- 6	- 14	+ 1	+ 8	+ 7

Some features of importance which this table illustrates may be here noticed. On the west coast the extreme difference of the wettest and driest years is 53 per cent. above and 18 per cent. below the average of nearly 100 inches; in the Carnatic, with an average of one-third this amount, the extremes are 42 per cent. above and 36 per cent. below it; in the Punjab, with an average of less than 22 inches, 37 per cent. above and 28 per cent. below it; and on the Deccan and Mysore plateau, with an average of 30 inches, 57 per cent. above and 44 per cent. below it. Bengal, with its average of 67½ inches, has a range of 19 per cent. above and 32 per cent. below it. No definite law of periodical increase or decrease is distinctly traceable in the table. In the Carnatic, indeed, were the two last years omitted, we should seem to have a confirmation of Mr. Pogson's speculation (well known through Dr. Hunter's pamphlet on the subject), viz., that the rainfall increases and decreases in an eleven-year cycle, coinciding with Wolf's cycle of sun-spot variation. Thus we have a series of six years, from 1863 to 1868, below the average, with a minimum of 1867; followed by a series of six years above the average, with a maximum in 1872; and again two years below the average, with a minimum in 1876—which agree fairly well with the sun-spot cycle, having

a minimum in 1867 and a maximum in 1870-71. But the last two years, 1877 and 1878, during which the sun-spot variation was still at a minimum, have brought the Carnatic a rainfall of respectively 26½ and 6 per cent. above the average, and thus throw doubt on the genuine character of the supposed rainfall cycle, and at least show that much more evidence must be collected before we can form a legitimate judgment on the question. The North-Western Provinces present something similar. Thus we have first three years in succession, 1864 to 1866, below the average; the first year being a minimum. Then follow two years, one of which has 39 per cent. in excess, and the next 35 per cent. deficiency; but passing over these, we have not less than seven successive years of rainfall above the average, with two maxima, viz., 1871 and 1874, and finally three years below it, with a minimum in 1877. Now, 1868 followed a year of minimum sun-spots; 1871 one of maximum; and 1877 is one of a series of minimum years from which we have not yet emerged. But 1867 is quite anomalous, and so is 1874; so that here, again, the real existence of a cycle is doubtful.

Again, there are certain cases in which unusually wet years are followed by unusually dry years, or vice versa, and others again in which an excessive rainfall in one or more provinces is coincident with a very

* This was not a merely apparent departure from the real course of variation, as I see stated in a recent newspaper notice which professes to be based on Mr. Pogson's authority. It was not due merely to the excessive rain accompanying a cyclone, as stated by the writer referred to, but chiefly to an unusually copious autumn monsoon, in the southern districts of the Presidency more especially. The error of the writer seems to have arisen from his having drawn general conclusions from the rainfall of one station only, viz., Madras.

deficient rainfall in others; but in both cases more exceptions are to be found than instances for the rule. Restricting our instances to those in which the rainfall is more than 20 per cent. in excess or defect of the average we have two instances, and two only, of good and bad years in immediate succession in the same province, and three in which two consecutive years have been of the same character. And again we find three years in which an excessive rainfall in one or more provinces has coincided with a very deficient fall in others, and nine in which all excessive departures from the average in the provinces considered have been in the same direction. This part of the investigation, however, evidently requires more complete data, and it must be deferred till the remaining portion of India and the Burmese Peninsula can also be considered.

The years in which a great deficiency of rainfall has been accompanied by severe famine are indicated in the table by the letter F, and those in which there has been scarcity, leading to much suffering, but not to widespread mortality, are designated by S. From this it would appear that in the Carnatic a deficiency, amounting to one-third of the average rainfall, has in two years been productive of severe famine. But in the North-Western Provinces a still greater deficiency, viz., 41 per cent., arising from the almost complete failure of the summer monsoon rains in 1877, although attended with much suffering, especially among the poorer classes, was not followed by the appalling consequences of the Madras and Bombay drought, owing to the fact that one season's crop only was lost, and a heavy fall of timely rain, which fell quite at the close of the season, enabled the cultivators to sow their winter crops.

It appears from a recent investigation of Mr. Hill's, the meteorological reporter to the Government of the North-Western Provinces, that a variation of this character, viz., the sequence of a copious winter rainfall on a scanty summer fall, and *vice versa*, is of not infrequent occurrence in the Punjab and Gangetic Provinces. Thus he finds that the twelve years 1845, 1850 to 1853, 1859, 1865 and 1866, 1868 and 1869, 1877 and 1878, had an excessive winter and deficient summer rainfall; and, on the other hand, that the thirteen years 1846 and 1847, 1854, 1856, 1858, 1861 to 1863, 1867, 1871, and 1873 to 1875, had dry winters, followed by wet summer. Against these twenty-five instances in favour of the rule we have only three years, viz., 1855, 1870, and 1872, with the rainfall excessive at both seasons, and six years, 1848 and 1849, 1857, 1860, 1864, and 1876, with a deficiency both in summer and winter. The very large proportion of instances favourable to the rule seems to indicate the probability of a casual interdependence of the phenomena; and I have elsewhere suggested such in the case of a deficient summer rainfall following on a copious winter precipitation, viz., the possible effect of an unusual accumulation of snow on the Himalaya in the winter and spring months, which, by cooling the air on the mountain-slopes, produces an increased atmospheric pressure, and a consequent flow of cold dry air to the plains of India, impeding and opposing the access of the summer monsoon. The registers of atmospheric pressure and wind direction during the years 1876 and 1877 lend support to this view; but further evidence is required before it can be accepted as more than a tentative hypothesis. Mr. Hill further considers it probable that both the summer and winter rainfall vary in an eleven-year cycle, corresponding with that of the sun-spots, but in opposite directions. Indeed, his tabulated data indicate that, while two years of excessive summer fall follow the year of maximum sun-spots by one and three years respectively, and two years of very deficient summer rains occur respectively two years before and coinciding with the year of sun-spot minimum, the heaviest winter fall precedes the year of sun-spot minimum, and the lightest coincides with the epoch of sun-spot maximum. There are, however, many anomalous oscillations, and the existing data are far from sufficient to allow of our estimating the numerical probability of a failure of either winter or summer rainfall in any given year. As a subject for further enquiry, the speculation is, however, of much interest, and may perhaps hereafter become of practical importance.

INFLUENCE OF FORESTS ON RAINFALL.

The disastrous effects of a general destruction of forests on agriculture and pasturage are generally

known, and have been abundantly illustrated during the present century in south-eastern France; but it is still a question whether the total rainfall of a country is thereby diminished. Direct observation on the rainfall of forest-clad countries, large areas of which have subsequently been denuded, are unfortunately wanting; and it is perhaps open to question whether comparative rainfall measurements made in the forest and clearings of temperate countries which are still in large part covered with forest, and the clearings of which are either pasture-land or under field cultivation, afford a criterion of the probable effects of a general denudation of forests in tropical and sub-tropical lands. A very elaborate series of comparative observation of the above kind carried on for five years at eight pairs of stations in the forests and clearings of Bavaria by Dr. Ebermeyer, have led him to the conclusion that "in plains of uniform character the influence of forests on the quantity of rainfall is certainly very small. With increased elevation above the sea-level, the influence of forests becomes more important, and it has therefore a greater value in mountain tracts than on plains. In summer the effect of the forests is much greater than in winter. In the cold season it is *overabundant*. In warm southern countries it is greater than in cold countries; and in the interior of continents, where the humidity of the air and the annual precipitation are diminished, and the summer heat is greater, it plays a more important part than in the neighbourhood of coasts. * * * From what has been said above, the clearing of a large area of country, at least of plain country, produces no essential diminution of the yearly rainfall. In hill-tracts, on the contrary, after denudation there will be, on the whole, less rain than before. In all cases the destruction of forests will affect the rainfall only in the warm season, viz., during the summer months."

From the above it may be inferred that, in a country such as India, the consequences of a general destruction of forests would be more important than in Europe, since the climate of India is essentially continental, and over a large part of its area the temperature, even of the cool season, is not very far short of the average summer temperature of the countries of which Dr. Ebermeyer writes. But, as already remarked, any direct evidence is wanting. The only point in this connection on which I have been able to obtain information—and this only as the general impression of old residents—is that quoted in my Meteorological Report for 1875, viz., that during the last twenty years dust-storms have become far less frequent than formerly in the Punjab; and this is attributed to the increase of plantation and the extension of cultivation under British rule. This is by no means an improbable consequence of cultivation; for dust-storms depend on the air in contact with the ground acquiring an excessive temperature, and the consequent disturbance of the vertical equilibrium of the atmosphere. Judging from the known effects of forests upon climate, more especially on the temperature and humidity of the ground and lower strata of the air in contact with the ground, I should anticipate that the effect of extensive denudation would be to render storms more violent and spasmodic in character, and perhaps to diminish the frequency of gentle and continued rainfall.

But however this may be, there can be no question of their influence in storing the subsoil waters. On this point Dr. Ebermeyer's observations are very decisive: "On the whole, the soil of forest-clad tracts, where covered with forest litter, yielded down to a depth of four feet 1,245 cubic Paris inches more water per 3 cubic feet than the soil of the open field. In forest ground cleared from litter there penetrated to 1 foot deep nearly twice as much water as on a bare flat in the open, in litter-covered ground at 1 foot deep $2\frac{1}{2}$ times more, at 2 feet deep $3\frac{1}{2}$ times more, and at 4 feet deep $2\frac{1}{2}$ times more." This was the mean result. But the difference was almost wholly due to the summer months, and would therefore be at a maximum in a climate such as India. To this conclusion Dr. Ebermeyer emphatically points. He says that "the influence of forest and forest-litter on the water storage of a region is by far the most important at the warmest time of the year and in hot countries; by the action of the forest an uniform distribution of the ground moisture is ensured throughout the year."

H. F. BLANFORD,
Meteorological Reporter
to the Govt. of India.

Calcutta;
26th March 1879. }

TABULAR STATEMENT OF THE AVERAGE MONTHLY AND ANNUAL RAINFALL AT 289 STATIONS IN INDIA AND HER DEPENDENCIES.

		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Year.
I.—WESTERN HIMALAYA. Punjab and N. W. P.	Abbotabad	3.05	3.77	4.79	2.89	2.96	3.15	8.83	8.03	3.11	1.24	1.15	2.61	45.59
	Murree	0.03	1.54	2.77	4.02	3.16	2.24	13.43	12.59	4.48	5.43	4.71	2.44	56.84
	Simla	1.54	1.85	3.68	3.59	4.27	8.40	13.23	17.34	6.44	1.36	0.12	0.79	68.61
	Dharmasala	4.40	5.06	4.73	2.23	2.53	10.74	40.26	36.95	11.74	1.62	0.39	2.56	133.21
	Chakrata	1.19	2.01	3.84	1.50	2.78	7.74	17.04	14.84	6.12	0.73	0.16	1.32	59.27
	Almora	1.54	2.06	1.67	1.13	2.22	5.38	9.52	7.79	4.44	0.94	0.20	0.58	37.47
	Naini Tal	3.27	2.87	2.76	1.57	2.56	13.44	20.25	22.34	9.61	1.95	0.05	1.73	83.40
	Ranikhet	1.52	2.57	1.51	1.21	2.80	5.99	12.86	10.79	5.86	0.66	0.10	1.30	47.17
	Delhi	0.92	0.60	0.71	0.38	0.78	2.92	8.55	6.72	4.88	0.54	0.09	0.33	27.42
	Gurgaon	0.78	0.34	0.55	0.35	0.86	2.73	9.75	6.78	5.63	0.51	0.03	0.34	28.70
	Karnal	1.27	1.38	1.02	0.36	1.03	4.19	10.32	6.34	3.69	0.50	0.07	0.41	30.51
	Hissar	0.57	0.55	0.49	0.26	0.68	2.38	4.84	3.89	2.27	0.29	0.06	0.36	16.54
	Rohatak	0.66	0.56	0.56	0.25	0.71	2.87	6.27	4.34	3.43	0.47	0.03	0.38	20.53
	Sirsa	0.67	0.36	0.49	0.38	0.58	2.38	3.51	3.40	2.05	0.27	0.03	0.34	14.46
	Umballa	1.41	1.38	1.01	0.63	1.03	4.18	11.53	8.75	4.57	0.84	0.14	0.71	36.18
II.—PUNJAB PLAINS. Punjab.	Ludhiana	1.05	1.19	1.47	0.59	0.89	2.03	8.16	6.51	4.13	0.81	0.05	0.74	27.08
	Jallundur	1.50	1.43	1.08	0.61	0.80	2.18	8.12	6.51	4.04	0.66	0.11	0.62	27.66
	Hoshiarpur	1.49	1.64	1.54	0.80	0.91	3.41	9.92	6.58	4.53	0.44	0.08	1.40	35.71
	Amritsar	1.06	1.18	0.86	0.67	0.83	1.72	8.09	6.21	2.57	0.67	0.29	0.77	24.92
	Sialkot	1.24	1.78	2.09	1.73	0.91	2.52	13.49	10.22	3.28	0.63	0.54	0.96	39.33
	Gurdaspur	1.60	1.99	1.78	0.58	0.74	3.70	9.58	7.07	3.85	0.82	0.21	1.17	33.09
	Lahore	0.83	1.03	0.92	0.44	0.78	1.21	6.73	4.07	2.03	0.64	0.09	0.66	19.28
	Ferozepore	1.34	0.93	0.77	0.58	0.56	2.60	7.54	5.95	2.57	0.55	0.06	0.51	23.96
	Gujranwala	1.50	1.31	1.16	0.85	0.68	1.39	8.70	6.39	2.08	0.54	0.17	0.71	25.48
	Rawalpindi	2.28	1.81	2.32	2.05	1.18	1.67	7.70	6.77	3.19	0.62	1.04	1.37	32.00
	Jhelum	1.59	1.49	1.68	1.12	0.54	1.82	7.25	5.32	2.01	0.62	0.26	0.99	24.69
	Guirat	1.90	1.74	2.83	1.56	0.66	2.38	9.37	7.73	2.91	0.65	0.20	0.89	32.82
	Shahpur	0.78	0.91	0.96	0.66	0.66	1.26	3.46	3.54	1.40	0.18	0.23	0.51	14.45
	Mooltan	0.32	0.24	0.53	0.44	0.49	0.27	2.10	1.10	0.90	0.16	0.07	0.31	6.93
	Jhang	0.38	0.43	1.07	0.58	0.52	0.88	4.13	2.25	0.93	0.29	0.08	0.49	12.03
III.—UPPER GANGETIC PLAINS N. W. P. and Bengal.	Montgomery	0.52	0.71	0.58	0.23	0.35	0.90	2.92	2.26	1.01	0.22	0.06	0.29	10.05
	Muzaffargarh	0.34	0.29	0.43	0.42	0.41	0.29	1.16	1.46	0.81	0.09	0.09	0.38	6.16
	Dera Ismail Khan	0.43	0.93	0.94	0.69	0.38	0.66	1.32	1.38	0.76	0.16	0.15	0.43	8.23
	Dera Ghazi Khan	0.43	0.41	0.83	0.39	0.32	0.33	1.96	1.33	0.76	0.09	0.17	0.41	7.35
	Bannu	0.77	1.23	1.39	1.41	0.61	1.03	1.78	3.46	0.76	0.21	0.34	0.49	18.48
	Peshawar	1.50	1.29	1.73	1.88	0.54	0.20	1.35	2.14	0.83	0.25	0.83	0.91	13.45
	Kohat	1.25	1.68	2.05	1.47	1.40	1.14	3.43	2.73	2.01	0.66	1.11	0.76	19.69
	Saharanpur	1.43	1.76	1.07	0.26	0.76	3.91	12.53	9.51	4.12	0.37	0.08	0.60	36.40
	Roorkhee	1.76	1.64	0.90	0.39	1.28	4.37	13.11	12.34	4.53	0.55	0.06	0.41	41.33
	Muzaffarnagar	1.25	1.25	0.85	0.38	1.10	3.66	10.62	8.36	4.58	0.49	0.07	0.34	32.95
	Meerut	0.85	0.87	0.59	0.50	0.87	3.62	9.44	6.49	3.66	0.52	0.02	0.36	27.79
	Balundshahr	0.67	0.75	0.38	0.25	0.61	2.73	8.64	7.24	4.52	0.73	0.04	0.47	27.02

TABULAR STATEMENT of the Average Monthly and Annual Rainfall at 280 Stations in India and her Dependencies—continued.

		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Year.
III.—UPPER GANGETIC PLAINS. N.W.P. and Bengal—cont.	Aligarh -	0.77	0.68	0.49	0.14	0.58	2.20	7.95	6.31	4.14	0.63	0.03	0.40	24.32
	Bijnor -	1.14	1.41	0.80	0.23	0.77	4.12	11.45	9.32	5.90	0.43	0.07	0.34	36.08
	Moradabad -	1.13	1.09	0.68	0.36	0.92	4.66	14.19	8.90	5.43	0.84	0.08	0.44	38.71
	Bareilly -	1.15	1.02	0.89	0.29	0.99	5.51	14.67	8.62	5.73	1.11	0.06	0.33	41.07
	Budaun -	0.92	0.59	0.33	0.07	0.54	3.65	10.70	8.07	5.93	0.71	0.06	0.42	31.99
	Shajahanpur -	0.88	0.79	0.43	0.18	1.29	5.09	12.00	7.70	6.71	1.22	0.12	0.42	36.85
	Muttra -	0.48	0.44	0.24	0.11	0.66	2.66	9.11	7.08	4.52	0.49	0.01	0.38	26.16
	Agra -	0.62	0.42	0.21	0.12	0.80	2.94	8.92	6.85	4.88	0.36	0.03	0.31	26.46
	Mainpuri -	0.87	0.37	0.30	0.12	0.55	2.34	9.12	7.80	6.01	0.88	0.06	0.56	28.98
	Farukhabad -	0.65	0.37	0.31	0.06	0.60	3.19	9.51	7.34	6.12	1.37	0.07	0.46	30.05
	Etawah -	0.60	0.31	0.43	0.10	0.52	2.08	8.14	8.72	5.22	1.34	0.11	0.37	27.94
	Etah -	0.36	0.32	0.56	0.16	0.51	1.77	9.40	7.94	4.22	1.14	0.01	0.35	26.74
	Cawnpore -	0.69	0.57	0.23	0.11	0.51	3.24	9.88	7.61	5.21	1.00	0.08	0.24	28.42
	Fatehpur -	0.61	0.40	0.28	0.18	0.27	3.94	9.48	8.51	6.19	1.09	0.07	0.18	30.50
	Allahabad -	0.79	0.61	0.25	0.14	0.34	3.53	11.17	9.40	6.06	0.74	0.09	0.15	34.87
	Hamiirpur -	0.54	0.41	0.20	0.09	0.53	4.25	11.76	8.63	6.26	2.14	0.13	0.33	33.42
	Jaunpur -	0.61	0.50	0.31	0.16	0.75	4.50	9.81	10.28	7.72	2.93	0.11	0.13	37.81
	Azamgarh -	0.55	0.58	0.31	0.23	0.83	4.49	13.00	12.57	7.48	1.55	0.04	0.13	41.98
	Mirzapur -	0.72	0.92	0.70	0.17	0.53	4.45	12.59	12.11	6.40	1.66	0.04	0.09	40.43
	Benares -	0.77	0.64	0.37	0.16	0.82	5.16	13.92	11.79	8.68	2.76	0.23	0.14	46.52
	Gorakhpur -	0.74	0.70	0.37	0.38	1.33	5.97	15.74	11.27	9.12	2.03	—	0.16	47.39
	Basti -	0.76	0.63	0.24	0.27	1.20	4.36	10.13	9.56	6.44	2.89	0.30	0.11	36.75
	Ghaziipur -	0.72	0.84	0.34	0.14	0.92	7.47	22.83	20.99	9.73	0.86	0.07	0.45	70.06
	Delhra -	1.76	2.44	1.48	0.67	1.45	3.27	11.24	11.57	8.81	2.46	0.19	0.17	34.25
	Banda -	0.73	0.38	0.36	0.09	0.35	5.12	11.51	10.94	8.83	2.93	—	0.74	42.47
	Lucknow -	0.69	0.37	0.31	0.17	0.70	5.56	10.79	10.10	10.61	1.52	0.01	0.73	39.99
	Unao -	0.55	0.45	0.40	0.19	0.59	6.96	11.36	8.36	7.37	1.82	—	0.55	40.10
	Navabganj -	0.97	0.49	0.57	0.40	0.51	4.54	12.49	9.06	7.25	2.86	—	0.90	40.10
	Sitapur -	0.80	0.58	0.48	0.34	0.91	6.44	11.32	10.65	9.57	1.89	—	0.60	44.44
	Hardui -	0.70	0.51	0.68	0.34	0.77	5.16	15.31	9.83	9.84	2.06	—	0.16	45.14
	Kheri -	1.35	1.02	0.51	0.12	0.97	6.42	12.29	8.53	10.19	2.19	—	0.45	45.36
	Fyzabad -	0.83	0.47	0.47	0.19	0.82	4.92	13.78	9.61	12.08	2.34	—	0.31	45.36
	Bahraich -	0.99	0.73	0.42	0.50	1.29	6.42	12.29	9.61	8.61	1.68	—	0.24	37.99
	Gonda -	0.60	0.65	0.33	0.24	0.66	4.50	13.51	11.18	10.50	2.14	—	0.18	46.72
	Rai Bareilly -	0.48	0.35	0.40	0.36	0.80	6.73	13.51	9.12	9.42	1.98	—	0.20	40.39
	Sultanpur -	0.67	0.31	0.35	0.07	0.35	4.86	12.65	8.37	7.20	2.79	0.13	0.18	38.21
	Paritabgarh -	0.83	0.47	0.35	0.29	1.55	6.54	9.69	9.68	7.21	2.85	—	0.11	41.38
	Patna -	0.69	0.53	0.25	0.36	0.80	6.73	13.51	9.12	9.42	2.65	0.18	0.07	45.77
	Gya -	0.69	0.65	0.47	0.29	1.55	6.54	9.69	9.68	7.21	2.85	0.18	0.07	45.77
	Arrah -	0.74	0.65	0.47	0.29	1.55	6.54	9.69	9.68	7.21	2.85	0.18	0.07	45.77
	Muzaffarpur -	0.93	0.63	0.37	0.72	1.41	6.22	11.64	9.68	7.20	2.79	0.13	0.18	41.38
	Durbhanga -	0.87	0.48	0.55	0.59	1.89	7.01	12.88	9.63	9.18	2.65	0.18	0.07	45.77
	Chupra -	0.56	0.35	0.31	0.39	1.74	6.18	10.57	9.27	8.65	3.45	0.02	0.05	42.57
	Mothari -	0.75	0.49	0.47	0.50	1.15	6.15	13.66	9.81	10.46	2.71	—	0.20	47.34
	Monghyr -	0.55	0.31	0.77	0.68	2.05	8.30	10.41	8.54	6.81	2.65	0.02	0.04	37.06
		0.45	0.61	0.46	0.43	1.85	6.20	11.33	10.50	7.82	3.60	0.04	0.10	45.17

TABLEAU STATEMENT of the Average Monthly and Annual Rainfall at 289 Stations in India and her Dependencies—continued.

			January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	YEAR.
VII.—WESTERN BENGAL. Bengal.	Bhagulpur	-	0.53	0.68	0.37	1.04	2.75	8.12	11.34	10.66	7.77	4.66	0.03	0.09	48.04
	Nya Doonka	-	0.83	0.82	0.62	1.43	3.35	10.37	13.35	13.82	9.96	6.31	0.01	0.29	58.19
	Cuttack	-	0.51	0.46	0.93	1.70	2.30	10.00	12.15	10.43	9.49	6.31	0.23	0.47	55.68
	False Point	-	0.58	0.91	1.15	3.93	2.71	10.84	15.58	14.11	10.94	12.66	2.83	0.12	76.36
	Pooree	-	0.20	1.19	0.59	1.33	2.45	7.95	9.48	11.44	9.16	8.26	1.78	0.65	54.38
	Balasore	-	0.98	1.21	1.63	2.70	4.36	10.45	11.55	12.33	12.68	7.33	0.68	0.11	66.01
	Hazaribagh	-	0.57	0.82	0.63	0.89	1.08	8.53	12.87	12.35	7.11	3.43	0.23	0.15	48.16
	Ranchee	-	0.98	1.09	1.42	0.68	1.07	7.42	11.61	11.23	7.79	3.31	0.15	0.12	47.47
	Chyebassa	-	0.98	1.10	1.53	1.08	2.94	9.18	13.55	12.86	8.98	3.85	0.14	0.14	56.33
	Purulia	-	0.51	0.88	0.79	0.88	1.81	9.11	10.76	12.11	7.11	4.26	0.08	0.17	48.47
VIII.—CENTRAL INDIA AND NERARODA India and Central Pro- vinces.	Jalaun	-	0.37	0.29	0.30	0.04	0.26	2.34	10.28	9.29	5.84	0.74	—	0.23	30.08
	Jhansi	-	0.41	0.23	0.38	0.18	0.19	4.11	12.44	10.35	5.72	0.77	—	0.22	35.03
	Lalitpur	-	0.56	0.33	0.43	0.20	0.68	5.04	14.08	10.49	5.81	0.79	0.03	0.27	38.71
	Sutna	-	0.67	0.78	0.30	0.04	0.20	4.65	18.72	12.10	5.86	0.70	—	0.06	44.08
	Rewah	-	0.70	1.47	0.13	0.48	0.27	8.62	25.50	16.93	8.20	1.22	0.02	0.02	63.56
	Nagode	-	0.77	0.46	0.24	0.25	0.40	4.81	18.08	12.21	7.81	2.52	0.05	0.25	47.85
	Jubbulpore	-	0.65	0.49	0.50	0.24	0.42	7.95	18.08	14.00	8.34	1.32	0.29	0.19	52.47
	Saugor	-	0.73	0.67	0.14	0.24	0.54	6.20	17.73	11.64	8.14	1.10	0.29	0.34	47.76
	Damoh	-	0.71	0.47	0.19	0.23	0.31	5.70	16.77	13.68	7.79	1.35	0.29	0.30	47.79
	Hoshangabad	-	0.40	0.14	0.25	0.05	0.53	5.46	14.26	12.82	9.78	0.72	0.36	0.32	45.09
IX.—RAJPUTANA AND GUZERAT. India and Bombay.	Narsingpur	-	0.42	0.36	0.22	0.25	0.48	8.10	15.51	11.94	7.84	1.60	0.13	0.29	47.14
	Khandwa	-	0.39	0.49	0.04	0.10	0.21	6.53	10.54	7.76	5.28	0.57	0.03	0.32	32.26
	Ajmere	-	0.67	0.41	0.30	0.15	0.52	2.01	6.45	7.62	3.93	0.27	0.13	0.40	22.86
	Uthar	-	—	0.27	0.25	0.72	1.86	0.72	6.45	6.80	4.44	0.88	0.02	0.89	23.30
	Sambhar	-	0.03	0.08	—	0.35	1.93	1.51	6.49	2.46	5.38	1.11	0.39	0.59	20.32
	Jeypur	-	0.12	0.11	0.60	0.34	0.63	0.91	9.87	2.47	4.19	0.36	0.11	0.56	20.27
	Mount Abu	-	0.27	0.34	0.27	0.03	0.62	5.42	18.39	23.88	7.57	3.69	0.07	0.30	60.85
	Neemuch	-	0.08	0.16	0.16	0.15	0.38	3.92	11.50	11.05	5.10	1.17	0.05	0.24	33.96
	Surat	-	—	0.06	—	—	0.18	9.87	12.11	10.96	5.97	0.80	0.15	0.07	40.17
	Broach	-	0.03	0.04	—	—	0.01	6.88	12.42	8.83	5.62	1.35	0.28	0.07	35.53
	Kaira	-	—	0.41	0.01	0.08	0.53	3.90	11.19	9.26	3.75	0.65	0.26	0.16	30.20
	Godhra Dispensary	-	—	0.25	0.02	0.01	0.19	4.93	15.70	12.27	7.75	0.83	0.07	0.15	42.17
	Ahmedabad City	-	—	0.18	0.05	0.08	0.96	3.24	9.87	9.30	4.18	1.13	0.06	0.10	29.15
	Baria	-	0.07	0.63	0.01	—	0.01	4.65	14.75	10.54	10.11	0.65	0.14	0.17	41.73
	Edar Dispensary	-	—	0.34	—	—	0.59	3.18	13.33	10.55	8.00	0.61	0.21	0.04	36.85
	Pahlanpur	-	—	0.40	0.01	0.03	0.92	1.75	8.00	11.65	4.95	0.40	—	0.04	28.15
	Rajkot	-	—	0.16	0.03	—	0.51	5.72	8.09	7.56	3.65	0.99	0.35	0.11	27.17
	Deesa	-	0.08	0.21	0.11	0.06	0.13	2.37	8.43	8.97	2.86	0.49	0.09	0.03	23.40

TABULAR STATEMENT of the Average Monthly and Annual Rainfall at 289 Stations in India and her Dependencies--continued.

			January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Year.
X.—SIND AND CATCH, Bombay.	Bhuj	-	0.01	0.22	0.08	0.03	0.26	2.18	4.01	3.89	2.45	1.09	0.01	0.06	14.29
	Kurrachee	-	0.69	0.26	0.13	0.01	0.07	0.22	2.59	1.69	0.82	0.09	0.09	0.23	6.89
	Sehwan Dispensary	-	0.08	0.21	0.43	0.22	0.04	0.01	2.23	2.92	1.47	0.01	0.37	0.10	8.78
	Tatia Dispensary	-	0.20	0.19	0.03	0.48	-	0.25	3.42	0.40	1.17	0.01	0.23	0.10	6.38
	Hyderabad	-	0.20	0.19	0.13	0.08	0.02	0.65	2.67	3.47	0.80	0.01	0.06	-	8.28
	Umarkot	-	0.18	0.06	0.20	0.02	0.15	1.15	3.83	4.58	1.10	0.50	-	0.01	11.78
	Nagor	-	0.19	0.11	0.09	-	0.46	2.13	4.31	6.68	1.89	0.42	0.01	-	16.31
	Shikarpur	-	0.40	0.32	0.63	0.27	0.04	0.21	1.21	1.47	0.25	0.01	0.10	0.18	5.09
	Rohri	-	0.46	0.53	0.71	0.39	0.33	0.33	1.24	1.00	0.40	-	0.13	0.34	5.86
	Jacobabad	-	0.27	0.27	0.30	0.17	0.18	0.10	1.37	0.99	0.33	-	0.15	0.15	4.28
XI.—KHARDESE AND BERAR, Bombay and India.	Dhulia	-	0.75	0.10	-	-	0.07	3.98	3.39	3.95	2.85	1.52	0.38	0.26	17.25
	Nasik	-	0.07	0.06	0.03	0.08	0.37	5.63	6.66	5.08	3.58	3.98	0.68	0.19	26.40
	Malegaon	-	0.56	0.10	0.04	0.46	0.24	5.21	3.03	4.22	4.89	2.25	0.43	0.52	21.95
	Amraoti	-	0.68	0.28	0.38	0.21	0.58	6.58	7.82	7.57	5.13	0.91	0.13	0.37	30.64
	Akola	-	0.51	0.22	0.43	-	0.18	5.47	6.05	5.65	5.05	0.66	0.31	0.27	24.80
	Buldana	-	0.54	0.18	0.12	0.14	0.93	5.96	6.05	7.25	5.37	1.47	0.15	0.28	28.24
	Chikalda	-	0.95	0.05	0.44	0.18	0.06	8.91	14.28	15.51	10.96	3.04	0.08	0.76	55.22
	Nagpur	-	0.71	0.47	0.64	0.49	0.70	8.59	12.63	8.54	7.34	2.01	0.32	0.40	42.83
	Bhandara	-	1.36	0.79	0.46	0.70	1.19	7.22	16.40	11.98	8.66	1.42	0.20	0.12	50.50
	Chanda	-	0.19	1.07	1.39	0.88	3.29	6.95	13.71	9.83	8.23	2.36	0.43	0.25	48.58
XII.—CENTRAL PRO- VINCES (SOUTH), Central Provinces.	Wardha	-	0.49	0.32	0.25	0.42	0.54	5.65	11.22	8.57	7.16	1.70	0.18	0.17	36.67
	Hingunghat	-	0.44	0.32	0.23	0.57	0.61	13.12	13.12	8.45	7.60	1.92	0.17	0.12	40.31
	Balaghat	-	0.69	0.65	0.23	0.71	0.77	12.58	21.57	16.07	9.17	1.33	0.11	0.23	64.11
	Sironcha	-	0.12	0.58	0.57	0.43	1.85	6.61	10.75	9.46	9.39	2.77	0.23	0.09	42.85
	Seoni	-	0.80	0.89	0.45	0.72	0.82	9.37	14.82	10.76	7.17	2.04	0.28	0.62	48.74
	Mandla	-	0.61	0.54	0.75	0.57	0.53	7.85	17.27	10.97	6.65	1.46	0.09	0.25	47.54
	Badnur	-	0.59	0.37	0.77	0.40	0.49	6.93	12.68	9.23	7.65	1.40	0.30	0.40	41.21
	Chindwara	-	0.92	0.33	0.55	0.31	0.48	9.59	11.19	8.30	8.07	1.77	0.19	0.31	42.01
	Pachmarhi	-	0.78	0.32	0.36	0.42	0.48	10.50	30.94	19.99	16.85	1.02	-	0.54	82.20
	Raipur	-	0.49	0.23	0.51	0.69	0.67	9.34	13.82	12.50	7.56	1.83	0.84	0.13	48.61
XIII.—NORTH DECCAN PLATEAUX, Bombay.	Sambalpur	-	0.62	0.61	0.71	0.59	0.60	11.21	15.90	14.15	8.02	2.37	0.11	0.10	54.99
	Bilaspur	-	0.65	0.22	0.95	0.61	1.02	9.14	12.52	11.37	6.68	1.65	0.15	0.30	45.26
	Ahmednagar	-	0.56	0.09	0.25	0.59	1.45	5.22	3.03	4.03	6.26	2.87	0.93	0.17	25.45
	Poona	-	0.28	0.05	0.19	0.54	1.56	5.90	6.65	4.30	4.10	3.91	0.74	0.21	28.43
	Satara	-	0.45	0.07	0.07	0.98	1.22	7.76	12.76	7.42	4.09	3.91	1.58	0.45	40.35
	Sholapur	-	0.05	0.13	0.29	0.82	1.22	4.49	4.19	5.03	6.09	3.35	0.66	0.17	26.49
	Kolhapur	-	0.02	0.01	0.03	1.09	1.66	7.66	10.93	6.68	3.84	4.70	0.53	0.16	37.31
	Belgaum	-	0.08	0.02	0.52	2.17	2.89	9.79	14.63	8.79	3.35	4.49	0.90	0.35	47.98
	Gokak	-	0.10	-	0.15	0.90	1.47	3.63	1.46	2.07	2.83	6.19	0.13	1.00	19.93
	Dharwar	-	0.16	0.02	0.32	1.24	2.59	5.65	5.78	5.05	3.27	5.77	1.73	0.61	32.19
	Hubli	-	0.10	-	0.21	1.47	2.32	4.37	4.02	2.98	2.80	5.04	0.43	0.39	24.13

TABULAR STATEMENT of the Average Monthly and Annual Rainfall at 280 Stations in India and her Dependencies—continued.

		January.	February.	March.	April.	May	June	July.	August.	September.	October.	November.	December.	Year.
XIII.—NORTH DECCAN PLATEAU, Bombay—cont.	Nargund	0.29	—	0.26	0.58	2.32	3.40	1.54	2.89	3.42	5.09	0.17	0.58	20.54
	Mandargi	—	—	0.22	1.58	0.62	1.54	2.55	0.81	3.39	2.22	—	0.06	12.99
	Kalghatgi	0.12	—	0.32	0.93	1.39	5.55	6.61	3.93	2.91	5.62	0.39	0.71	28.48
	Bijapur	0.04	—	0.36	0.57	0.38	4.07	1.88	3.96	4.90	3.58	0.14	1.28	21.26
	Bellary	0.03	0.04	0.40	0.85	1.74	2.11	1.01	2.22	3.52	3.54	0.50	0.10	16.06
XIV.—HYDRABAD AND SOUTH DECCAN, India and Madras	Gooti	0.06	0.09	0.08	0.57	1.88	2.59	2.67	3.73	4.34	3.97	0.76	0.11	20.85
	Kurnool	0.02	0.06	0.35	0.86	2.43	3.85	5.19	5.79	7.00	3.67	0.80	0.21	30.23
	Secunderabad	0.60	0.22	0.95	0.64	1.31	2.97	5.47	5.25	4.48	3.02	0.76	0.17	25.84
	Bangalore	0.26	0.15	0.55	1.49	5.08	3.02	3.66	5.76	6.55	5.53	1.71	0.77	34.53
	Igatpuri	0.20	0.23	0.12	0.17	1.06	21.18	42.28	33.54	14.84	4.30	0.39	0.22	118.53
XV.—KONKAN AND GHATS, Bombay.	Lanoli	0.12	0.06	0.50	0.05	0.22	28.44	66.32	37.86	23.41	2.49	0.04	0.12	159.63
	Malcolm Peth	0.56	0.03	0.54	1.12	1.13	46.16	95.90	69.39	30.64	5.61	1.07	0.10	252.25
	Baura	—	0.04	0.06	0.94	0.69	54.80	97.22	53.85	38.16	6.67	0.97	0.40	251.80
	Karwar	0.17	—	0.10	0.33	1.84	34.57	37.66	19.90	10.34	4.14	0.83	0.19	110.07
	Honawar	0.38	—	0.26	0.39	2.35	41.71	42.66	27.84	15.27	5.50	0.96	0.21	137.53
XVI.—MALABAR AND GHATS, Madras.	Vingorla	0.35	—	0.08	0.09	1.00	33.91	36.26	20.80	10.47	3.59	0.35	0.04	105.94
	Ratnagiri	1.97	0.02	—	0.31	1.04	31.92	32.42	18.31	12.27	2.96	1.00	0.09	102.31
	Colaba	0.13	0.02	—	0.04	0.48	20.97	24.08	15.12	10.61	1.59	0.45	0.04	73.53
	Byculla	0.26	—	—	—	0.23	21.94	23.66	18.66	11.74	2.04	—	—	80.53
	Tanna	0.02	0.14	0.01	—	0.15	25.26	34.45	20.50	10.88	2.58	—	—	93.99
XVII.—CARNATIC, Madras.	Matheran	0.03	—	0.03	0.01	0.06	44.43	105.47	69.55	32.63	4.51	—	0.03	256.75
	Mangalore	0.23	0.12	0.16	2.35	7.82	39.73	37.88	22.24	10.93	8.38	1.51	0.56	131.91
	Calicut	0.23	0.25	1.09	2.86	7.94	36.59	30.23	13.24	8.10	8.42	2.83	1.79	113.62
	Cannanore	0.64	0.40	0.17	2.86	6.46	45.13	43.54	17.45	9.61	7.21	1.94	0.39	135.60
	Cochin	1.05	0.80	1.39	5.15	12.13	31.82	22.17	11.37	8.72	11.35	4.20	2.00	112.15
	Manantoddy	0.43	0.55	1.07	2.40	4.18	23.39	29.63	15.19	7.66	5.95	1.78	1.82	93.05
	Palghat	0.10	0.17	0.32	2.34	3.69	19.06	19.65	9.96	5.38	5.96	2.75	0.91	70.59
	Tellicherry	0.57	0.11	0.46	3.20	7.29	41.29	37.96	15.71	10.10	6.43	1.73	0.78	125.65
	Arcoot	0.50	0.88	0.44	0.35	2.74	1.34	3.40	5.01	5.29	4.91	4.35	1.70	30.92
	Chittoor	0.26	0.26	0.50	0.41	3.63	2.83	2.77	4.74	5.38	6.08	3.57	1.89	31.82
	Balmanair	0.17	0.21	0.44	0.45	2.57	2.69	2.75	3.09	5.09	5.84	3.24	1.39	27.93
	Vellore	0.77	0.46	0.18	0.54	2.86	2.44	3.05	4.99	5.91	7.00	4.82	2.12	35.14
	Cuddalore	0.60	0.44	0.17	1.55	1.90	1.01	2.11	4.54	4.59	8.05	1.34	4.96	42.56
	Tundavannam	0.43	0.94	0.22	0.68	2.03	2.02	2.72	6.91	6.52	8.44	7.50	2.79	42.15
	Virdachellam	0.50	0.51	0.08	0.57	1.94	1.20	2.26	4.14	4.99	5.16	3.72	3.04	30.11
	Chingleput	0.38	0.45	0.11	0.22	2.02	1.73	2.62	3.60	4.70	6.90	8.04	3.13	33.93
	Conjeveram	0.76	0.65	0.14	0.35	2.32	2.13	3.92	3.92	6.44	6.67	7.12	2.59	33.01
	Caraor	0.33	0.19	0.39	2.17	3.77	1.77	1.12	2.72	3.64	5.76	2.41	1.89	25.72
	Combarore	0.14	0.14	0.52	1.24	2.69	2.23	1.32	0.93	1.37	5.20	3.13	0.85	26.90
	Cuddapah	0.15	—	0.31	1.24	1.24	2.29	3.21	4.59	5.53	5.93	2.39	0.52	26.61
	Dindigul	0.01	0.47	0.27	1.57	3.25	1.74	1.41	3.29	3.27	7.25	1.62	3.42	26.56

TABULAR STATEMENT of the Average Monthly and Annual Rainfall at 289 Stations in India and her Dependencies—continued.

		January.	February	March.	April.	May	June	July.	August.	September.	October.	November.	December	Year.
XVII.—CARNAṬIC. Madras—cont.	Madura.	0.46	0.49	0.57	2.37	2.45	2.03	1.60	3.98	3.54	8.18	5.00	2.50	33.17
	Pasumali	0.93	0.51	0.87	2.56	2.71	0.99	2.34	4.04	4.11	8.05	4.91	2.40	34.42
	Nellore	0.57	0.16	0.37	0.11	1.35	1.56	2.11	3.39	3.14	9.56	7.54	3.61	33.47
	Ongole	0.35	0.04	0.17	0.08	1.30	1.23	2.36	3.09	3.15	6.07	3.90	0.86	22.27
	Ahmedn.	0.41	0.37	0.62	1.42	4.38	1.34	2.11	2.81	5.64	8.25	3.90	1.23	32.48
	Salem	0.24	0.08	0.69	2.22	4.60	2.43	3.71	4.07	5.91	7.29	1.56	0.63	33.43
	Shoroor Hills	0.29	0.21	0.69	2.42	6.46	4.87	7.66	9.17	8.99	11.34	4.65	3.23	59.98
	Combacorum	0.61	0.71	0.54	0.92	1.84	1.97	2.75	3.88	4.70	8.94	7.66	5.08	39.60
	Negapatam	0.92	0.99	0.09	1.42	2.13	1.07	1.32	2.67	3.65	7.78	13.33	8.87	44.24
	Tanjore	0.64	0.63	0.47	1.14	1.78	1.00	1.90	3.21	3.21	5.95	4.49	3.41	28.85
XVIII.—NORTHERN Circars, Madras.	Tanjore	0.79	0.41	0.01	1.65	1.80	1.17	2.31	3.71	3.33	9.08	13.45	8.78	46.49
	Tinnevely	1.74	1.14	1.30	1.98	0.88	0.76	0.26	0.61	0.91	6.22	9.76	2.74	28.30
	Tuticorin	1.24	0.38	0.58	1.56	0.63	0.15	0.23	0.21	6.25	7.52	7.52	2.13	18.50
	Oodiarpalliam	0.72	0.53	0.02	0.97	3.67	1.55	3.03	4.40	4.49	7.99	6.22	3.75	37.34
	Trichinopoly	0.90	0.60	0.63	2.20	4.07	2.34	2.35	3.98	5.87	8.54	4.85	3.37	39.70
	Aska	0.33	0.49	1.33	1.87	2.93	6.55	7.73	7.60	8.92	6.72	1.08	0.37	45.92
	Ganjam	0.19	0.64	0.85	1.29	1.51	5.80	4.39	5.25	9.22	8.85	0.39	0.14	38.52
	Cocanada	0.23	0.30	0.12	0.54	2.01	4.03	4.95	4.97	6.65	8.91	1.82	0.32	34.95
	Ellore	0.37	0.13	0.48	0.86	1.36	3.55	5.42	5.78	7.11	6.00	1.79	0.42	33.27
	Rajahmundry	0.25	0.15	0.21	1.20	3.33	3.88	6.74	5.60	6.47	6.50	0.91	—	35.24
XIX.—ARAKAN. British Burma.	Guntur	0.53	0.21	0.73	0.87	1.82	3.25	4.67	6.17	6.01	7.15	0.97	0.20	32.58
	Masulipatam	0.30	0.10	0.48	0.03	1.41	3.47	5.73	5.19	6.87	8.53	1.94	0.19	34.24
	Bimlipatam	0.38	0.69	0.11	0.24	1.44	3.04	3.50	3.82	6.46	7.81	0.93	0.25	28.67
	Vizagapatam	0.44	0.37	0.38	0.92	2.84	5.23	4.69	6.21	7.38	12.13	1.66	0.78	43.03
	Vizianagram	0.26	0.65	0.68	0.45	2.03	3.69	4.71	5.90	7.59	7.76	1.14	0.20	35.06
	Akyab	0.13	0.21	0.45	1.18	13.32	47.30	48.29	36.41	26.06	11.83	3.85	0.20	189.23
	Kyauk Phyo	0.11	0.08	0.43	1.05	9.92	39.41	43.19	39.02	20.85	9.63	4.95	0.12	170.76
	Sandoway	0.07	0.09	0.20	0.78	15.04	53.07	59.95	49.63	24.91	12.23	2.52	0.09	218.58
	Rangoon	0.06	0.06	0.08	1.69	12.27	19.82	21.67	18.56	15.61	9.06	2.83	—	101.71
	Bassein	0.25	—	0.14	1.02	7.53	16.22	26.28	21.81	14.80	7.27	2.56	0.03	97.61
XX.—PEGU, British Burma.	Henzada	0.11	—	—	0.56	6.13	15.74	19.39	16.96	11.02	4.67	2.29	—	76.87
	Prome	—	—	0.01	0.84	6.17	9.69	9.37	14.46	7.72	6.46	1.74	—	56.46
	Thayetmyo	—	0.04	0.13	0.59	6.71	8.30	9.18	10.24	8.72	5.40	1.72	0.01	51.04
	Toungheo	—	—	0.04	0.98	6.99	11.93	16.94	17.32	10.65	8.03	1.49	0.06	74.43
	Moulmein	—	0.04	0.14	3.13	21.13	38.75	43.72	43.89	31.51	8.13	0.94	0.01	191.34
	Tavoy	0.13	0.71	0.58	3.42	18.12	39.03	44.81	42.66	33.96	10.03	1.90	0.12	195.47
	Mergui	0.41	1.34	1.80	4.94	17.13	28.34	29.25	28.05	24.41	12.37	2.35	0.46	151.15
	Shwegyeen	0.01	0.42	0.66	1.61	14.76	35.37	36.18	33.82	20.26	10.56	1.85	—	155.50
	Port Blair	0.74	2.15	0.23	2.18	16.64	18.36	17.12	16.85	18.28	12.88	7.85	2.97	116.25
	Nancowry	3.26	1.45	3.31	7.20	9.54	15.90	9.94	11.53	10.34	13.96	7.23	6.92	100.58
XXI.—TENASSERIM, British Burma.														
XXII.—Bay Islands.														

The second class of phenomena in which a periodicity coinciding with the sun-spot cycle is believed to have been discovered, has reference to solar radiation and thermometric variations. For reasons which would require too much space to detail, various difficulties complicate this line of research, and we should state at the outset, that the evidence is less complete and satisfactory than that which connects magnetic disturbances and rainfall with sun-spots. A moment's consideration will show the kind of complication to which we refer. If the earth had no atmosphere, all the solar energy would be incident and operative on the earth's surface, where perforce our measuring instruments are placed. But the earth has an atmosphere which is the vast scene of the play of the solar energies; and the work done there is of such a nature that the more energy there is in operation, the more effectively is the direct energy of the sun screened from the surface. Further, there is not wanting evidence to show that the vapour of water, like the vapours of the metals, exists in various molecular conditions, some of which are transparent and others opaque to those rays which affect our thermometers.* The thermometric inquiry divides itself into several distinct branches, such as the direct solar radiation or calorific intensity of the sun's light, the daily temperature range, and the mean annual temperature. We shall very briefly state the conclusions at which observers have arrived during the last ten years, without criticism or any expression of opinion.

In 1867 Mr. Joseph Baxendell communicated the results of a scrutiny of the Solar Radiation Registers kept at the Radcliffe Observatory, Oxford, from 1856 to 1864. He came to the following conclusions, among others. First, that the calorific intensity of the sun's light is subject to periodical changes, the maxima and minima of which correspond respectively with those of sun-spot frequency. Second, that it seems probable that the heating rays of the sun consist of two kinds, differing in intensity, and subject to periodical changes; the times of maxima of one kind and those of minima of the other corresponding respectively to the times of maximum frequency of solar spots. Mr. Baxendell also pointed out a connection between the mean monthly variation of solar radiation on cloudless days and the mean monthly daily range of the magnetometer. In 1871 he published his further researches on the changes in the distribution of barometric pressure, temperature, and rainfall, under different winds during a period of solar-spot frequency. He found that changes had taken place in the three elements under discussion, which corresponded very closely in the times of their maxima and minima with those of sun-spot frequency. In 1875 Mr. H. F. Blanford, Meteorological Reporter at Calcutta, stated, from experiments conducted in Bengal: "The result is to me very striking, and if not absolutely conclusive as to the direct variation of the sun's heat with the number of spots and prominences, certainly, as far as it goes, strongly confirms Mr. Baxendell's conclusions."

In 1877 Mr. S. A. Hill, the Meteorological Reporter to the Government of the N.-W. provinces of India, commenced a comparison of the solar radiation temperatures recorded at several stations in Upper India. The results he obtained were exactly the opposite of those got by his predecessors in this branch of investigation, the highest sun temperatures occurring in years of fewest spots, and the lowest in those of most spots. Mr. Hill thinks the difference in the results he obtains from those got by Mr. Blanford, is, to a great extent, owing to the different methods they employ in discussing their respective observations.

In all probability a uniform method of discussing observations would lead to more uniform results. The question, however, of the sun's variable radiation of heat will probably be best answered by the actinometer, a modification of which, recently invented by Professor Balfour Stewart, is, we understand, about to be employed in India.

In 1875 Professors Balfour Stewart and Roscoe, from an investigation of the heating effects of the sun, came to the conclusion that there is more sunshine at London in years of maximum than in years of minimum solar disturbance. Next year, 1876, Professor Balfour Stewart found that the winter temperature-range at Kew apparently depends on the sun-spot period, being greatest at times of maximum sun-spots and least at times of minimum sun-spots. In 1877 he raised, and produced

evidence upon, the interesting question whether the mean daily range does not depend, among other influences, on the state of the sun's surface with regard to spots.

Meanwhile, another series of observations had been going on, not with black bulb thermometers for solar radiation, but with reference to the mean annual temperature. In 1870 professor Piazzi Smyth, the Astronomer-Royal for Scotland, published the result of observations made from 1837 to 1869, with thermometers sunk in the rock at the Royal Observatory, Edinburgh. He came to the conclusion that a great heat wave occurs every eleven years and a fraction, its maximum slightly lagging behind the minimum of the sun-spot cycle. Next year, 1871, Mr. E. J. Stone, the Astronomer-Royal at the Cape of Good Hope, examined the temperature observations recorded during thirty years at the Cape under his predecessor, Sir T. Maclear. He stated that the temperature and sun-spot curves presented an agreement so close as to compel him to believe that the same cause which leads to an excess of mean annual temperature leads equally to a dissipation of solar spots. Here also we find the maximum heat slightly lagging behind the minimum spots. Dr. W. Köppen's papers in the *Zeitschrift der österreichischen Gesellschaft für Meteorologie* for August and September 1873, form a most important contribution upon the question. He endeavoured, with an elaboration and completeness not previously attempted, to present the earth's temperature in connection with sun-spots for the hundred years preceding 1870. He divided the thermometric returns into two great classes—those taken within the tropics, and those belonging to the extra-tropical zones. The barest summary of his researches would occupy several pages. In a carefully prepared chart, he exhibited the temperature and sun-spot curves from 1768. During the earlier part of this period, he had thermometric returns only from the northern temperate zone. So far the curves do not show a coincidence; whether from the local character of the temperature returns, or from the uncertain value of the sun-spot curve, we need not here inquire. After the year 1826, when the sun-spot data become more trustworthy, the case is entirely different. The curves follow each other in a most striking manner; and, indeed, he states that from 1816 to 1854 the coincidence of temperature changes with the sun-spots does not merely extend over the average length of the cycles, but reflects all the leading disturbances and peculiarities of the sun-spot periods. Dr. Köppen further points out that as the period of increase from the minimum to the maximum year in the sun-spot cycle is almost always shorter than the period of decrease from the maximum to the minimum, so, on the whole, is that feature reflected in the temperature changes. The parallelism in this series of returns, he says with reference to his table dealing with the period from 1820 to 1854, is so great, that there can be no question of accidental coincidence of variations independent of each other. On the other hand, his figures disclose many anomalies. Thus, in the tropics, the maximum of warmth occurs a full year before the year of minimum sun-spots, while in the zones beyond the tropics it falls two years after the minimum. The regularity and magnitude of the undulation of the temperature curve is most strongly marked in the tropics, and decreases towards the poles.

Since Dr. Köppen's article appeared, the question of the variation of air temperature with the sun-spots has been revived by Dr. F. G. Hahn, of Leipzig, in a work which, up to the present time, forms the most extensive and valuable contribution to the general question as yet made.* In this work he goes a step beyond Köppen, and compares the summer and winter temperatures over large tracts of Europe and America, separately with the sun-spot epochs. His results, from observations which embrace the period 1709-1875, not only confirm those of Köppen regarding the mean annual temperature, but show that both summer and winter at the time of minimum sun-spot are decidedly warmer than at the opposite epoch.

With regard to the third class of phenomena, wind disturbances, the evidence, although less abundant, is more uniform. The frequency of such disturbances at times of maxima sun-spots has been observed independently by two meteorologists on the opposite sides of the globe. In both cases their observations were made in the tropics, where wind disturbances have so violent and so well-marked a character as to admit of more easy

* There is evidence to suggest that the aqueous vapour produced at the period of minimum sun-spots would be more transparent to the heat-rays than that produced at other times.

* *Ueber die Beziehungen der Sonnenflecken-periode zu Meteorologischen Erscheinungen.* Von Dr. F. G. Hahn, Leipzig. 1877.

enumeration than in the extra-tropical zones. To our countryman, Dr. Meldrum, (Government astronomer at Mauritius, belongs the honour of originating, with the chief credit of prosecuting, this research. By a series of careful observations he had, more than five years ago, established the existence of a coincidence between the frequency of cyclones and sun-spots. In 1872 one of the writers of this article thus summarized the results: "Mr Meldrum tells us that the whole question of cyclones is a question of solar activity, and that if we write down in one column the number of cyclones in any given year, there will be a strict relation between them—many sun-spots, many hurricanes; few sun-spots, few hurricanes. Mr. Meldrum points out that in those years in which we have been quietly mapping out the sun-spot maxima, the harbours were filled with wrecks and vessels coming in disabled from every part of the great Indian Ocean." Next year, 1873, M. Poey, who had conducted a similar research into the hurricanes of the West Indies, communicated his results to the Académie des Sciences at Paris. He enumerated 357 hurricanes between 1750 and 1873, and stated that out of 12 maxima, 10 agreed. A careful re-examination of his materials discloses striking coincidences, but at the same time we ought to add, very serious discrepancies. The discrepancies, however, chiefly belong to the last century and the earlier part of the present one. Since the commencement of Schwabe's continuous sun-spot observations in 1826, the common periodicity is more strongly marked, as Table III. on p 26 will show. A comparison by Dr. Hahn, in 1877, of the number of typhoons in the China seas, a list of which had been made by Mr. Piddington, covering the period 1780-1841, led to similar results.

During the summer of 1877, an effort was made to ascertain whether the periodicity thus observed in the wind disturbances of the tropics produces any well-marked results upon the shipping of the world. Mr. Henry Jeula, secretary to the late Statistical Committee of Lloyd's, obtained the returns of marine casualties posted at Lloyd's Loss-book from 1855 to 1876. Conjointly with Dr. W. W. Hunter, one of the writers of this pamphlet, he worked out the information thus derived with regard to the two periods of eleven years from 1855 to 1876. It was found that the marine casualties disclosed a cycle closely corresponding with the sun-spot period. The percentage of casualties on the registered vessels of the United Kingdom was seventeen and a half per cent. greater during the maximum two years in the common cycle than during the minimum two years. The percentage of losses on the total posted on Lloyd's Loss-book during the eleven years was fifteen per cent. greater during the two maximum years of the common cycle than during the two minimum ones. This cycle of marine casualties coincides with that of the tropical rainfall, and it will be exhibited side by side with the tabulated periods of the rainfall at Madras. It should be remembered, however, that the two periods of eleven years for which the returns of marine casualties are available, form a very narrow basis for a statistical induction.

Evidence with respect to the fourth class of atmospheric phenomena to which we intend to refer, viz., clouds, though as yet somewhat limited, and, from the complicated conditions which give rise to their formation, of small inductive value, is yet of considerable interest and importance from its intimate bearing upon that afforded on the collateral subject of rainfall.

To ensure greater clearness, we will divide the results into two sections,—first, those that deal with general cloud or cloudiness; and secondly, those that relate to the frequency with which some particular form or variety of cloud has been observed to occur.

With regard to general cloudiness in relation to the frequency of sun-spots, it was observed some years ago by Schwabe, the discoverer of their periodical recurrence after his patient watch of twenty years, that sun-spots seemed more frequently associated with cloudy than with fine weather. In opposition to him, Dr. H. J. Klein, the well-known meteorologist, considered that in years of few sun-spots the sky was more often observed to be cloudy than in those of many sun-spots. Since then, Dr. Hahn has compared the relative cloudiness in different years at Leipzig and Münster, with results which confirm the opinion held by Schwabe, viz., that years of many spots are also those of much cloud, but with this restriction, that the relation only holds in the summer months. This restriction is a very necessary point, as the winter cloudiness at Leipzig follows precisely the reverse law,—the maximum of cloud occurring at the minimum epoch of the sun-spots, and *vice versa*.

Now this opposition in the results of the two seasons, which at first sight appears destructive of any real connection between the two phenomena, is, in reality, in exact accordance with what has already been found by Dr. Hahn to hold in the case of the air-temperature at different seasons in Europe. For it is an acknowledged and readily accountable fact, that presence of cloud in the summer is associated with coolness, and in the winter with warmth, and in like manner that a clear sky, which in the summer, by promoting solar radiation, favours the development of great heat, in the winter, by giving free scope to terrestrial radiation (in the then comparative absence of solar radiation), tends to produce excessive cold. The fact, therefore, that clouds are more prevalent in the summers of maximum sun-spot years, and in the winters of minimum sun-spot years, is only another way of saying that both summer and winter are cooler at the former epoch, and warmer at the latter. It also warns us to expect a similar change of type in the rainfall variation, the summers of maximum sun-spot years and the winters of minimum sun-spot years being the wettest; which, indeed, has been found, though upon limited evidence at present, to be probably the case in the temperate zones.

The only particular form of cloud to which allusion will be made with reference to its apparent variation with the sun-spots, is the cirrus. This variety is important not only from its intimate connection with storms, whose approach it often signals, but also because it is (especially that form of it called "polar bands") closely associated with, and by some believed to be one of the proximate causes of, the Aurora Polaris. Herr Weber of Peckeloh finds these polar bands, like the Aurora, most frequent in years of maximum sun-spot.

In like manner Dr. Klein, from observations made at Cologne extending from 1850-1870, has found that all kinds of cirrus cloud are most frequent at the same epoch. It is further found by Dr. Hahn, from observations made at Dresden between 1856 and 1867, that solar and lunar halos, and mock-suns (all of them optical phenomena depending for their production upon the presence of the ice-crystals composing cirrus cloud), increase and decrease with the sun-spots like the cirri themselves.

We are now come to the fifth and last branch of the inquiry. We have already seen that Mr. Joseph Baxendell, in 1871, found that changes had taken place in the rainfall as well as in the temperature and barometric pressure, which corresponded very closely in their maxima and minima periods with those of sun-spots. Dr. Meldrum, from a comparison of the rain return at Mauritius, Adelaide, and Brisbane, came to the conclusion that the evidence of a connection between its maxima and minima periods, and the corresponding sun-spot periods, although not absolute, was very striking, and demanded further inquiry. In 1872, one of the writers of this pamphlet published a paper, entitled *The Meteorology of the Future*, in which was developed the idea of a connection between sun-spots and rainfall, and further evidence was produced. In 1872-3, frequent contributions appeared on the subject, but at first with conflicting results. In opposition to individual coincidences, Sir R. Rawson believed that, "assuming that sun-spots affect all parts of the globe equally, and that periodicity prevails in all alike, the experience of Barbadoes is opposed to the theory." Dr. Carl Felmek of Vienna, from an examination of fourteen stations between 1833 and 1869, showed that while a coincidence held good in fifty-two cases, it failed in forty-two. In 1873 the inquiry branched out into a new direction. Gustav Wex made an examination into the depths of water recorded in the Elbe, Rhine, Oder, Danube, and Vistula, for the six sun-spot periods from 1800 to 1867. He came to the result that the years in which the maximum amount of water appeared in the rivers were years of maximum sun-spots; while the minimum amount of water occurred during the years of minimum sun-spots. Mr. G. M. Dawson, geologist to the B. N. A. Boundary Commission, made a similar inquiry in America. In 1874 he stated that the correspondence between the periods of maxima and minima in the solar-spot cycles, and in the fluctuations of the great lakes, though by no means absolute, was sufficiently close to open a new field of inquiry. In the same year, Mr. J. H. Hennessey, from an examination of the rainfall at Masiri in India, arrived at a similar conclusion. In 1874, also, Dr. J. A. Brunn, in an analysis of the returns from ten stations, considered it probable that a difference of about two inches in the

rainfall might be expected between the years of greatest and the years of least sun-spot area. Professor John Brucklesby, in the *American Journal of Science*, stated that the results of his examination pointed to a connection between variations in the sun-spot area and the annual rainfall—the rainfall rising above the mean when the sun-spot area is in excess, and falling below the mean in periods of small sun-spots.

During the past few years great accessions have been made to our knowledge of rainfall variation in its relation to the sun-spots. In particular, the necessity of comparing the rainfall at different seasons, as well as that of the whole year (with the sun-spots), has been insisted upon by one of the writers of this pamphlet, both on theoretical grounds, and also because the result of doing so in one case at least, viz. in Northern India, showed that a change of season sometimes effects a complete change of type in the variation; the summer rainfall, like the total annual rainfall elsewhere, varying directly with the sun-spots; while the winter rainfall north of lat 22° invariably followed the inverse law, being greatest at the epoch of minimum sun-spots, and *vice versa*. Other parts of the world, such as Southern India, experience, like Northern India, two distinct seasonal rainfalls during the year, separated more or less from one another by an interval of dry weather. In Southern India, however, this phenomenon being merely due to the advance and return of the same vapour-current, no change of type in the rainfall variation is experienced, but only a quantitative difference between the effects of the vapour-current in different localities, according as it blows from the Malabar or the Coromandel coast. In Northern India the change from summer to winter ushers in an entirely new vapour-current,—the antimonsoon,—and so brings about a change of type in the variation.

Comparisons of total annual rainfall in various parts of the world by different persons still continue to confirm the relation which has hitherto been found with few exceptions to be uniformly the case, viz., the more sun-spots, the more rain.

One of the most recent as well as most extensive comparisons of total annual falls, was that made by Mr. Meldrum in 1877, in which he employed the returns from no less than 128 stations widely scattered throughout Europe and America. The general conclusion derived from these was similar to that obtained by Mr. J. Allan Brown, viz. that on the average the rainfall at all the stations in years of maximum sun-spot area exceeds that at the opposite epoch by about two inches. Since then, in August 1878, Mr. Orville A. Derby came to a similar conclusion from an examination of the rainfalls of Ceará and Rio de Janeiro in Brazil, a part of the globe not included in any of the comparisons which had hitherto appeared.

At the close of 1876, it was the duty of one of the writers of this pamphlet to minutely examine the Madras rainfall in connection with the anticipated famine. It became apparent to him that inquiries which deal with the rain supply of India as a yearly unit must be essentially inadequate. Native usage and speech strongly mark the existence of two distinct factors in the annual rainfall, namely, the summer and the autumn monsoons; and the local system of agriculture is merely a practical recognition of this meteorological fact. The summer monsoon, with its stately procession of rain-clouds marching over India in aerial battalions from the southern ocean to the Himalayas, formed a theme dear to the Sanskrit poet. It seemed as if the continent "beloved of Indra" had only to sit still and receive in her lap the treasures which the winds gathered from distant tropical seas. Indra, the personification of the Watery Atmosphere, won his way to the supreme godhead of the Sanskrit pantheon by the all-powerful influence which he exercised, for weal or for woe, on a population of husbandmen. Himself gracious and beneficent, ever seeking to shower his treasures on the thirsty earth, he was nevertheless restrained, and from time to time prevented, by the evil spirit, Vrita. Next to Indra came Vāyu, the Wind, representing in his single personality the combined Maruts or storm-gods. The same Indra and Vāyu, the Watery Atmosphere and the Wind, whom the Sanskrit race adored centuries before the commencement of our era, still decide each autumn the fate of the Indian people.

The meteorological year at Madras divides itself into three parts. The first of them extends from January to the end of April, with a nominal rainfall of but half an inch per mensem. The second commences towards the end of May or early in June, and lasts till the end of September or beginning of October. It is

popularly known as the south-west monsoon, and if we include in it the month of May, it supplies 17 inches of the yearly rainfall of $48\frac{1}{2}$; if we exclude the month of May, it yields 15 inches. In October the northerly wind sets in, and the last three months of the year derive from its influence a rainfall of close on 29 inches. In an inquiry such as the present, the first four months of the year, with their sporadic rainfall of half an inch per mensem, may be dismissed. The two over-ruling factors in the rainfall are the south-west monsoon from May to September, and the north-east monsoon from October to December. If either of these monsoons fails to bring its supply of rain, or if they both fail partially, the result is famine. Of the five Madras famines since the institution of rain gauges, three have been caused by the failure of the winter monsoon, one by the failure of the summer monsoon, and one by the partial failure of both.

The Madras rainfall, therefore, furnishes three distinctly marked elements for comparison with the cycle of sun-spots. There is first, the north-east monsoon during the last three months of the year, bringing its average rainfall of nearly 29 inches; second, the south-west monsoon from May to September, supplying over 17 inches, or 15 if we take it as commencing from June; and third, the total yearly rainfall of $48\frac{1}{2}$ inches. Does sun-spot activity exercise any influence upon the supply which the two great water-carriers collect from the ocean tract stretching from the southern pole to India, and then shower upon that country?

As regards the principle factor, the north-east monsoon, which brings 29 inches out of the whole yearly rainfall of $48\frac{1}{2}$ inches, the statistics are these. Of the six years of minimum sun-spots, including 1876 as one, since rain gauges were kept at Madras, the N.E. monsoon has in five had a distinctly deficient rainfall. The average rainfall of the north-east monsoon during these six years of minimum sun-spots has been only 16.94 inches, against the average of 28.90 inches which the north-eastern monsoon annually brought during the last sixty-four years. The north-east monsoon in years of minimum sun-spots brings, therefore, 41.30 per cent. less rain than in ordinary years; or, put differently, it brings 70 per cent. more rain on the average of 64 years than in the years of minimum sun-spots. Nor is this deficiency confined to the exact year of minimum sun-spots. Taking the years of minimum sun-spots together with the preceding years, the north-eastern monsoon yielded 25 $\frac{1}{2}$ per cent. less rainfall during the twelve years thus made up than its average yield during the sixty-four years for which returns exist. Or, put in other words, the average water supply brought to Madras in ordinary years by the north-eastern monsoon is 31 $\frac{1}{2}$ per cent. greater than that which it brings during the years of minimum sun-spots and the years immediately preceding them.

The south-west monsoon yields little more than one-half the rainfall which the north-eastern one supplies to Madras. Its deficiency during years of low solar-spot activity is, however, well marked. If we take the south-west monsoon as commencing in June, it yielded in each of the six years of minimum sun-spots less rain than in ordinary years. Its water supply during the six years of minimum sun-spots averaged only 12.12 inches, or 20 per cent. less than its normal rainfall of 15.13 inches in ordinary years. If we include the rainfall for May in the south-west monsoon, it yielded less than its normal average in five out of the six years of minimum sun-spots. In only one year of minimum sun-spots did the south-west monsoon (including the May rainfall) yield more than its average supply, taken over the sixty-four years. It is very doubtful whether the exceptional year, 1843, was really an exception. A great rain-storm took place in May, before the monsoon had established itself, and of a character different from the regular monsoon rains. This storm poured down a sudden deluge of over 14 inches on Madras, and completely disguised the average for the monsoon months, the ordinary rainfall in May being just two inches. Deducting this rain-storm in 1843, the southern monsoon has proved deficient at Madras, whether we take it to commence in May or June, during every year of minimum sun-spots since the returns began in 1813. This deficiency is well marked, not only in the years of minimum sun-spots, but in the years preceding and following them. Thus, even including the month of May and the exceptional rain-storm of May 1843, the southern monsoon during the six years of minimum sun-spots, and the years immediately preceding them, yielded, during the twelve years thus made up, 20 $\frac{1}{2}$ per cent. less rain than its average yield in the sixty-four

years. Or, expressed in another form, the water supply brought to Madras by the southern monsoon is 26½ per cent greater in ordinary years than in the years of minimum sun-spots and those immediately preceding them.

The two monsoons are the great factors of the rain supply at Madras, and their fluctuations are distinctly marked in the third element of comparison, the total rainfall for the year. In five out of the six years of minimum sun-spots the annual rainfall fell short of the average supply, calculated over the sixty-four years. The exceptional year was 1843, and its exceptional character was due to the sporadic rain-storm in May, already mentioned. Even including that rain-storm, however, the six years of minimum sun-spots had an average rainfall of less than 31½ inches, against the ordinary annual rainfall of 48½ calculated over the sixty-four years. The minimum years of sun-spots, therefore, brought 29 per cent less rainfall than ordinary years; or, put into another form, the average annual

rainfall supply at Madras is 40½ per cent greater than in years of minimum sun-spots.

In each of the three elements of comparison, the deficient rainfall is not confined to the minimum year of sun-spots, but includes the preceding year as well. But it should be clearly stated that no numerical proportion exists between the actual number of sun-spots and the number of inches. There is a rain cycle of eleven years at Madras, which coincides with the cycle of sun-spots. The periods of maxima and minima in these two cycles disclose a striking coincidence. That coincidence is common to all the three elements of comparison,—namely, the rainfall of the year, of the great northern monsoon, and of the south-western monsoon. The following table will show this. The cycle of eleven years starts from 1876 and runs back to 1813, at which year the rain-returns commence. The eleventh, first, and second series in the cycle include all the years of minimum sun-spots since 1810, and form the minimum group of rainfall.—

TABLE I.
ELEVEN YEARS' CYCLE OF SUN-SPOTS AND RAINFALL AT MADRAS

Series of Years in the Cycle of Eleven Years	Average Annual relative Number of Sun-spots (Wolf's List, 1877), 1810-75	Total Average Annual Rainfall at Madras, 1813-75	North-east Monsoon, Madras, Oct-Dec. Average Annual Rainfall, 1813-75	South-west Monsoon, Madras, May-Sept. Average Annual Rainfall, 1813-75
Minimum group { Eleventh ¹ series - - - - - First ² and second ³ series - - - - -	16·3 } av 10·8 { 12·6	Inches 37·03 } av 42·07 { 40·39	Inches. 18·76 } av 26·49 { 23·92	Inches. 15·78 } av 14·08 { 14·65
Third ⁴ and fourth ⁵ series - - - - -	28·6	49·12	32·67	14·89
Fifth ⁶ and sixth ⁷ series - - - - -	88·3	54·64	31·48	19·68
Seventh ⁸ and eighth ⁹ series - - - - -	65·3	52·36	30·64	18·93
Ninth ¹⁰ and tenth ¹¹ series - - - - -	38·5	49·02	27·67	18·53
Eleventh ¹² series - - - - -	16·3	37·03	18·76	15·78

¹ Namely, 1876, 1865, 1854, 1843, 1832, 1821 (1810, Sun-spots only)
² „ 1866, 1855, 1844, 1833, 1822, (1811, Sun-spots only).
³ „ 1867, 1856, 1845, 1834, 1823, (1812, Sun-spots only)
⁴ „ 1868, 1857, 1846, 1835, 1824, 1813.
⁵ „ 1869, 1858, 1847, 1836, 1825, 1814.
⁶ „ 1870, 1859, 1848, 1837, 1826, 1815.

⁷ Namely, 1871, 1860, 1849, 1838, 1827, 1816.
⁸ „ 1872, 1861, 1850, 1839, 1828, 1817.
⁹ „ 1873, 1862, 1851, 1840, 1829, 1818.
¹⁰ „ 1874, 1863, 1852, 1841, 1830, 1819.
¹¹ „ 1875, 1864, 1853, 1842, 1831, 1820.
¹² „ 1876, 1865, 1854, 1843, 1832, 1821, (1810, Sun-spots only).

The cyclic coincidence may be tested in another way. If there is a true coincidence it should disclose a well-marked minimum group at the extremities of the cycle (in the eleventh, first, and second years), and a well-marked maximum group in the middle of the cycle (the fifth and following years). The years on both

sides of the central maximum group should yield intermediate results, and when taken together, should form a well-marked intermediate group. Dividing the cycle, therefore, so far as the number admits, into three equal groups of four years, we get the following results —

TABLE II
ELEVEN YEARS' CYCLE OF SUN-SPOTS AND RAINFALL AT MADRAS.

Years.	Average relative Number of Sun-spots (Wolf's List, 1877), 1810-75.	Total Average Annual Rainfall at Madras, 1813-75	North-east Monsoon, Madras, Oct-Dec. Average Annual Rainfall, 1813-75.	South-west Monsoon, Madras, May-Sept. Average Annual Rainfall, 1813-75.
MINIMUM GROUP Eleventh, first, and second years of the cycle of eleven years - - - - -	12·6	40·39	23·92	14·65
INTERMEDIATE GROUP Third, fourth, ninth, and tenth years of the cycle of eleven years - - - - -	43·5	49·07	30·27	16·71
MAXIMUM GROUP. Fifth, sixth, seventh, and eighth years of the cycle of eleven years - - - - -	76·8	53·50	31·06	19·31

Has this recurring period of deficient sun-spot and rainfall any practical result on the food supply of the people?—It is well known that at the end of the last century and during the earlier years of the present one, Southern India suffered an almost perpetual distress. But for these years we have no rain register; and the desolation spread by native misrule, together with the

drain of food for great armies in the field, sufficed to intensify every local scarcity to the starvation point. A march of Tippu Sultan left a worse blight on a district than a dozen inches of deficiency in the rainfall; and Mahrattá raids were a more direct and frequent factor of famine than the sun-spots. We are destitute of the first conditions for a scientific study of the food

supply until we reach the period of settled British rule and rain gauges.

It would be fruitless, therefore, to extend the inquiry beyond the year 1810, the earliest year in the sun-spot cycles with which we deal. The years of famine at Madras since that date have been 1811, 1821, 1833, 1854, 1866, and 1877. These famines were caused by deficient rainfall in the preceding years, namely, in 1810, 1823, 1832, 1853, 1865, and 1876. Now, five out of these six years of drought fell within the three years' group of minimum rainfall and sun-spots shown in the foregoing tables; the remaining drought (1853-5) extended over a year immediately preceding the minimum group and two years within that group, the famine itself resulting within the minimum group. Three of the six years of drought fell exactly in years of minimum sun-spots; one fell in the year preceding a year of minimum sun-spots; one fell in the second year preceding a year of minimum sun-spots; the remaining drought (1853-5) fell in the first, second, and third years preceding a year of minimum sun-spots.

There have been other years of scarcity in Madras. But the above six years were selected by Sir William Robinson, sometime Acting Governor, as the years of true famine, without any acquaintance with the writer's speculations on the rainfall, or of any cycle being supported or disproved by them. No famine in Madras has been recorded, from 1810 to 1877, caused by a drought lying entirely outside the minimum group of sun-spots and rainfall (as shown in the foregoing tables). The only drought which could be claimed as an exception, 1853-5, extended over two years within the group and the year immediately preceding them. It is shown as an exception in Table III.

The foregoing statistics refer to the single station of Madras. They are, however, of special value for testing the coincidence between sun-spot frequency and the rainfall which the north-east monsoon brings to Southern India. For that monsoon strikes the land with all its first vigour at Madras. By the time it crosses the Eastern Ghâts, and finds its way to the central plateau, it has got rid of the aqueous burden which it has carried down the Bay of Bengal. To the tableland of Mysore it brings only eight inches, while at Bellâri and in Haidarâbâd it only supplies three. But even at Mysore a deficiency of rainfall in years of minimum sun-spots is disclosed. Of four years of minimum sun-spots for

which materials exist (1876 to 1837), not one had quite the full annual rainfall; and the average rain supply brought by the forty years was close on 16 per cent. greater in Mysore than the rainfalls in the years of minimum sun-spots.

To Bombay, the north-east monsoon brings scarcely any rain, and the returns lately published omit it, as being 'immaterial' in twenty out of sixty years. The south-west monsoon is at Bombay the great factor of rainfall. According to those returns, the rainfall at Bombay was more or less below the average in every one of the six years of minimum sun-spots during the sixty years. The average rain supply of the sixty years was 18 per cent. greater than the average rainfall in the six years of minimum sun-spots. A well-marked coincidence exists between the eleven years' cycle of sun-spots and the rainfall at Bombay. This will be clearly shown in Table III.

Passing from these two points on the great Indian Ocean lying north of the equator, to another station in the south, we find similar results. The periodicity in the rainfall of the Cape of Good Hope is even more strongly disclosed in the following table than that of Madras or Bombay. The Australian stations do not lie upon the Indian Ocean, and are separated from it by a great continent. The evidence which they yield on the subject is meagre and irregular; but such as it is, it scarcely bears on an inquiry which deals with the water supply collected by the great periodical winds from the Indian Ocean.

The collateral evidence with regard to a common periodicity between the sun-spots, wind disturbances, and rainfall, may therefore be ranged under ten heads. These are: First, magnetic declination; second, electrical displays (auroras); third, Dr. Meldrum's list of cyclones in the Indian Ocean; fourth, M. Poëy's hurricane lists for the West Indies; fifth, the marine casualties posted on Lloyd's Loss-book; sixth, the rainfall at Madras brought by the north-eastern, and seventh, by the south-western monsoon; eighth, the annual rainfall at Madras; ninth, the annual rainfall at Bombay (almost entirely brought by the south-western monsoon); and tenth, the annual rainfall at the Cape of Good Hope. We have stated the facts as regards solar radiation, mean temperature, and clouds; but they do not, in our opinion, supply a sufficiently firm basis for induction. The rest of the evidence is exhibited in the table following.

TABLE III.
ELEVEN YEARS' CYCLE OF SUN-SPOTS, TERRESTRIAL MAGNETISM, ELECTRIC DISPLAYS (AURORAS), WIND
DISTURBANCES, MARINE CASUALTIES, RAINFALL, AND FAMINE.

Series of years in the cycle		Relative number of sun-spots, 1876-1810. Wolf.	Annual inequality of magnetic declination, referred to Paris, 1871-1811. Balfour Stewart.	Electric displays: auroras observed, 1871-1811. Stewart from London.	Number of cyclones, Indian Ocean, 1807-56. Meldrum.	Relative area of cyclones Indian Ocean, 1807-56. Meldrum	Number of hurricanes, West Indies, 1873-1810. Hunter from Poëy's lists.	Percentage of losses on registered vessels of United Kingdom, 1876-56. Jodha and Hunter	Percentage on total losses posted on Lloyd's loss-book each eleven years, 1876-56. Jodha and Hunter.	Madras rainfall, N. E. monsoon, 1876-75. Hunter.	Madras rainfall, S. W. monsoon, 1876-43. Hunter.	Madras rainfall, annual, 1876-43. Hunter.	Bombay rainfall, annual (clouds), 1876-17. Hunter.	Cape of Good Hope, annual rainfall 1870-43. Hunter (from Storm's Returns).	Madras famine-causing droughts, 1876-1810. Hunter.	
Average of															actual	
Minimum Group	Eleventh series	16.3	6.73	32	8.0	2.78	3.30	9.93	7.64	18.76	15.78	37.03	70.32	21.19		No. 4
	First and second series	10.8	6.75	20	7.0	1.77	2.15	11.91	9.32	26.49	14.08	42.07	68.02	20.98		1
	Third and fourth series	48.6	7.93	34	8.5	1.70	2.15	11.05	8.64	32.87	14.89	49.12	67.36	23.92		0
	Fifth and sixth series	88.3	10.08	57	13.5	7.54	5.00	12.21	9.31	31.48	19.68	54.61	71.22	28.11		0
	Seventh and eighth series	65.3	8.81	54	13.0	10.88	3.50	12.82	9.81	30.64	18.93	52.36	79.34	27.80		0
	Ninth and tenth series	38.5	7.51	50	8.0	5.09	3.30	11.84	9.09	27.67	18.53	49.02	76.42	23.26		1
Eleventh series		16.3	6.73	32	8.0	2.78	3.30	9.93	7.64	18.76	15.78	37.03	70.32	21.19		4
THE SAME SHOWN IN GROUPS.																
Minimum Group.																
Eleventh, first, and second series		12.63	6.74	26	7.33	2.10	2.53	11.25	8.74	23.92	14.65	40.39	68.78	21.05		5
Intermediate Group.																
Third, fourth, ninth, and tenth series		43.55	7.72	42	8.25	3.39	2.72	11.44	8.86	30.27	16.71	49.07	71.89	23.59		1
Maximum Group.																
Fifth, sixth, seventh, and eighth series		76.80	9.45	55	13.25	9.21	4.25	12.52	9.56	31.06	19.31	53.50	75.28	27.95		0

The main point of inquiry in that table may be thus stated. Is the variation in solar activity, as indicated by the waxing and waning of solar up-rushes, spots,

and prominences, reflected in terrestrial phenomena? Consequently, does a common cycle exist in solar and terrestrial phenomena, in addition to and independent

of the two ordinary cycles caused by the diurnal and by the annual revolutions of the earth?

To answer this question we have examined the results separately arrived at by students of six classes of phenomena—namely, the sun-spots as an index of solar energy, terrestrial magnetism, temperature, wind disturbances, cloud, and rainfall. We find that as regards sun-spots and terrestrial magnetism a common cycle of eleven years is now an established fact; that there are indications (although not proofs) of an eleven years' cycle in solar radiation, mean temperature, and cloud proportion; that there is ample evidence of such a cycle in wind disturbances; and absolute proof of a cycle of eleven years in the great factors of the Madras rainfall. We further find that the eleven years' cycle in the separate classes of terrestrial phenomena corresponds with the eleven years' cycle of sun-spots, and that with regard to the three sets of terrestrial phenomena on which we possess fullest evidence (magnetism, wind disturbances, and rainfall), the correspondence is most clearly established. At the commencement of the paper we saw that on *a priori* grounds—arrived at from recent solar work, there was reason to suspect an eleven years' cycle common to the phenomena of the earth and the sun. We have now shown by an induction from widely separated but converging series of facts, that such a cycle exists.

This induction has a very practical interest. We have seen that the eleven years' cycle in terrestrial magnetism has a direct and important influence upon telegraphic enterprise, that the cycle of wind disturbances produce distinct results upon the percentage of casualties among the shipping of the world, and that the cycle of rainfall in Southern India has a coincidence with the local cycle of famine. Professor Stanley Jevons has lately proved the close connection of the cycle of sun-spots and rainfall with a cycle of commercial prosperity and disasters. But it is evident that many mediate causes must intervene in such a connection, which do not affect the cycles of physical phenomena on which we rest our case. One of the writers of this pamphlet has dealt with the subject purely as a statistician, whose duty it was to discover and tabulate all collateral evidence bearing upon the discovery which he had made regarding the cyclic character of the factors of the Madras rainfall. Another writer has re-examined that evidence in its bearings on solar physics; while a third has added the paragraph on clouds, noticed a few facts made known since the article was first written, and tested the whole as a mathematician, and from a purely meteorological point of view. The conclusions at which they have jointly arrived are—First, that notwithstanding many apparent anomalies and a large area of unexplained facts, the evidence suffices to establish the existence of a common cycle; second, that the subject merits the earnest attention both of men of science and of those who have to deal with the great present problem of Indian administration—the problem of recurring famines.

A study of the rainfall is one of the first duties of a civilised government in India. Indra and Vāyu, the Watery Atmosphere and the Wind, are still the prime

dispensers of weal or woe to the Indian races. Hundreds of thousands of lives lie every year at the mercy of the rainfall. The population is a constant (or rather an increasing) quantity, emigration on any adequate scale being incompatible with the feelings of the people. The area of tillage is also a constant quantity throughout a great part of India, spare land being no longer available. But whether the yield of the one constant quantity will or will not suffice for the necessities of the other, depends each autumn on the rainfall—a quantity which has hitherto been regarded as altogether inconstant and beyond calculation. We believe that the supposed inconstancy of the rainfall is simply the measure not of its freedom from law, but of our ignorance. We do not think it wise, from the data here collected, to prophesy future famines at Madras; although five out of the six famine-causing droughts of this century, since 1810, happened at Madras within the minimum group of our cycle, and the sixth fell in that group together with the year immediately preceding it. The time for safe prediction has not yet come. But we do think that the cyclic character of the Madras rainfall must henceforth enter into considerations connected with the food supply of the people, and into arrangements for husbanding and distributing the water supply of Madras. The problem is how best to conserve and utilize the rainfall, not merely of the year, but of the cycle.

Fortunately while the study of the rainfall forms a prime State duty in India, there is perhaps no country in the world better suited than India for meteorological research. If a meteorologist were to sit down and construct a model field for his inquiries, he would make a continent stretching from near the equator up into the temperate zone. He would cut off his field by a great wall on the north, with smaller coast-walls running down towards the southern extremity, and with two distinct, regular, and well-ascertained sets of winds playing from a vast expanse of ocean upon each side. India is precisely such a model. If we are ever to reach the great laws which regulate the weather, it will be by combining meteorological observations with statistical inductions in a country like that, where the general laws have a sufficient space to produce general results, and where the disturbing influences are regular and well ascertained. The first step is to find the quantitative value and variations of the several factors of Indian rainfall. Nothing will be accomplished by jumbling together rain returns from nonhomogeneous stations, at which, for their situation and surroundings, the same factors act in a totally dissimilar manner. Thus, if the north-eastern monsoon produces a periodicity in the rainfall of Madras, where it contributes twenty-nine inches of the total rainfall, there is no cause for surprise in not finding a similar periodicity at Bellari or Haidarabad, where it only yields three. The figures in the foregoing pages establish the cycle of rainfall at only two stations in India, but they are the stations for which returns exist for the longest periods, and at which the two great factors of the Indian rainfall can produce clearly marked effects.

REPORT ON THE VARIATION OF RAINFALL IN TROPICAL INDIA WITH THE CYCLE OF SUN-SPOT FREQUENCY, BY MR. H. F. BLANFORD.

The pamphlet lately put forth by Dr. Hunter treats of two subjects; which are virtually distinct, *viz.*, the rainfall of the presidency town of Madras, and the occurrences of famines in various parts of Southern India. Amid many fluctuations, which at present are reducible to no law, the annual rainfall of Madras city appears to be subject to a regular cyclical variation, in periods of about eleven years, and the epochs of maximum and minimum precipitation coincide approximately with those of sun-spot frequency, long since established by the labours of Schwabe and Wolf. This fact is, however, not new to science. It was brought to notice originally in 1872 by Mr. Norman Lockyer, and has only received extended confirmation at the hands of Dr. Hunter, who had at his command the more abundant materials lately furnished by Mr. Pogson. That seasons of scarcity and famine in Southern India tend to recur also at intervals of about eleven years, and at

the epochs of sun-spot minimum, if satisfactorily established, would be a discovery of very great importance, but it is obvious that the former class of facts can hardly be adduced in support of the latter, unless it can also be shown that a deficiency in the rainfall in the presidency town indicates a deficiency productive of famine over some considerable area of Southern India. Till this is done, the supposed periodicity of the latter class of phenomena has only such validity as may be warranted by the facts independently adduced in its support. Unfortunately, this which to the administrator is the subject of cardinal importance, is treated of in a very cursory manner in the pamphlet, and I regret that I am not able to add anything of importance to Dr. Hunter's data. In order to establish any conclusion which might serve as a guide to the probable necessities of the future, it would be necessary carefully to collect all the available evidence

on the extent, intensity, and causes of famines, say, since the beginning of the century; and to subject the whole to a perfectly impartial and rigorous analysis. Whatever may be the law of famine recurrence in Southern India, whether or not these disasters tend to recur, as Dr. Hunter believes, more especially at the epochs of minimum solar activity, or whatever be the numerical expression of that tendency, it does not appear to hold good in Northern India. The years 1836, 1837, and 1838 were years of maximum sun-spots, but in the N. W. Provinces these were also years of unusually deficient rainfall, productive of famine. And the famine of Upper India in 1861 followed on the failure of the winter rains in 1860-61, these being also years of maximum sun-spots. Again, the scarcity in Khandesh in 1872 occurred only two years after the year of most abundant sun-spots of this century, and when the number was still above that of any previous year of maximum except 1837.

As I am not in a position to discuss this important, but at the same time somewhat intricate, question of the relative intensities of past famines, and the causes which in each case have contributed to exacerbate or mitigate their severity, I shall restrict this investigation to the question whether, in tropical India generally, the quantity of the annual rainfall shows any decided tendency to fluctuate in an eleven-year cycle; and thus endeavour to supply the link which is logically wanting

to connect the two subjects discussed in Dr. Hunter's pamphlet. The discussion, I must promise, is very far from exhaustive. It has, indeed, been an object of the Meteorological Department, ever since it was first established, to bring together the records of rainfall in parts of India that relate to past years, with a view to a thorough investigation of the laws of its distribution both in space and time; and thus, amid a large number for shorter periods, I have obtained the registers of seven important stations which extend back thirty years and upwards. These will serve as a basis for the present discussion. But there is little doubt that they are but a small portion of the data actually extant for equally long periods, and I believe that at some future day it may be possible to resume the enquiry with more ample materials, and with far more comprehensive objects.

The seven stations in question are all situated within the tropics. They are Madras, Bangalore, Mysore, in Southern India; Bombay, Nagpur, Jubbulpore, and Calcutta. In a foot-note below, are enumerated the sources from which the registers have been severally derived, and the following table exhibits the whole of the data tabulated according to the years. The final column gives Wolf's relative numbers of sun-spot frequency up to 1874. The accompanying diagram exhibits the data for the three presidency towns in a graphic form, together with the curve of sun-spot variation according to Wolf's determination.

TABLE I.
ANNUAL RAINFALL REGISTERED AT SEVEN STATIONS IN TROPICAL INDIA.

YEAR.	TOTAL RAINFALL IN INCHES.								Wolf's relative number of sun-spot years	YEAR.	TOTAL RAINFALL IN INCHES.								Wolf's relative number of sun-spot years.
	Madras.	Bangalore.	Mysore.	Bombay.	Nagpur.	Jubbulpore.	Calcutta.	Madras.			Bangalore.	Mysore.	Bombay.	Nagpur.	Jubbulpore.	Calcutta.			
1813	45.11	—	—	—	—	—	—	13.7	1815	37.65	32.70	34.10	54.73	—	44.02	00.02	33.0		
1814	32.41	—	—	—	—	—	—	20.0	1816	79.81	40.00	27.20	87.48	—	58.55	70.44	47.0		
1815	56.00	—	—	—	—	—	—	35.0	1817	80.99	37.50	25.40	70.01	—	44.90	72.36	79.4		
1816	41.16	—	—	—	—	—	—	45.5	1818	51.76	40.30	26.00	75.80	—	35.12	58.00	100.4		
1817	63.56	—	—	103.60	—	—	—	43.5	1819	39.81	27.80	25.40	114.80	—	40.02	70.51	05.0		
1818	76.25	—	—	81.07	—	—	—	34.1	1820	30.88	40.40	30.70	50.24	—	44.50	70.28	61.5		
1819	36.83	—	—	77.00	—	—	—	22.5	1821	04.32	36.30	22.00	93.07	—	38.54	04.10	61.9		
1820	70.01	—	—	77.84	—	—	—	8.9	1822	72.60	55.10	52.80	60.27	—	70.05	81.61	62.2		
1821	47.18	—	—	82.59	—	—	—	4.3	1823	35.82	34.70	37.80	02.56	—	50.80	62.08	37.7		
1822	50.01	—	—	112.22	—	—	—	2.0	1824	43.20	20.00	20.50	82.14	—	52.70	06.47	10.2		
1823	26.62	—	—	61.70	—	—	—	1.3	1825	32.32	27.10	33.00	41.18	20.10	57.07	70.30	6.0		
1824	83.72	—	—	33.87	—	—	—	0.7	1826	46.00	43.30	20.80	05.02	40.30	43.00	04.23	4.2		
1825	50.05	—	—	72.24	—	—	—	17.1	1827	52.05	30.40	30.30	51.27	30.23	51.08	08.07	21.0		
1826	00.73	—	—	73.49	57.61	—	—	20.1	1828	18.50	37.80	30.20	02.45	35.10	30.02	59.70	80.0		
1827	88.41	—	—	81.03	53.01	—	—	30.9	1829	55.14	26.60	27.80	77.61	34.40	40.01	08.00	06.4		
1828	37.69	—	—	121.08	46.49	—	—	52.5	1830	27.64	33.20	30.70	02.15	45.11	48.35	52.61	08.6		
1829	36.87	—	—	65.65	50.25	—	50.94	53.5	1831	37.19	30.51	30.20	76.01	45.80	45.03	80.10	77.1		
1830	32.43	—	—	71.86	32.80	—	63.28	50.1	1832	38.18	37.30	35.00	73.03	35.82	30.10	73.48	50.4		
1831	44.35	—	—	101.53	65.81	—	56.90	38.8	1833	54.01	35.80	31.10	77.08	30.60	50.15	61.15	15.7		
1832	13.45	—	—	74.00	30.71	—	50.72	22.5	1834	47.23	33.60	32.20	45.57	34.66	45.43	84.22	47.1		
1833	37.11	—	—	71.39	—	—	60.56	7.5	1835	41.64	30.00	30.00	77.85	44.50	60.42	61.58	32.5		
1834	89.00	—	—	70.47	—	—	08.73	11.4	1836	51.80	33.80	35.10	78.14	43.11	53.11	05.74	17.5		
1835	41.47	—	—	62.61	—	—	85.50	45.5	1837	24.37	63.00	28.50	02.30	57.75	73.10	72.73	7.3		
1836	44.76	—	—	87.61	—	—	15.66	06.7	1838	51.43	32.16	20.22	02.12	25.40	28.80	01.10	37.3		
1837	40.26	44.30	22.70	64.38	—	—	43.01	111.0	1839	32.31	40.11	31.87	01.06	33.38	02.77	02.00	73.0		
1838	52.83	10.00	20.20	50.78	—	—	52.09	82.6	1840	74.10	20.04	35.03	06.21	41.03	77.78	00.20	130.1		
1839	53.07	32.40	?	73.62	—	—	61.97	68.5	1871	50.35	20.10	27.38	40.58	46.75	50.22	03.81	111.2		
1840	56.05	30.20	15.80	63.15	—	—	50.11	51.8	1872	73.67	40.75	26.28	76.48	40.94	67.10	51.05	101.7		
1841	58.32	38.00	38.10	71.49	—	—	60.25	29.7	1873	51.83	20.13	21.42	60.70	30.03	46.11	45.27	00.3		
1842	36.45	31.20	23.80	95.16	—	—	76.12	10.5	1874	62.00	56.54	20.00	82.18	40.88	80.03	61.18	44.0		
1843	50.27	37.20	22.60	50.27	—	—	61.34	8.0	1875	37.12	22.00	20.22	84.50	54.86	51.63	50.80	—		
1844	65.86	84.40	34.00	65.40	—	—	73.86	13.0	1876	21.72	17.34	22.02	50.01	37.42	50.03	80.23	—		

Madras, from a printed table drawn up last year by Mr. Pogson.

Bangalore and Mysore up to 1861, from a printed register drawn up in 1862, by Mr. Puckle, of the Mysore Commission. For the years since 1861, I am indebted to the courtesy of the Chief Commissioner, Mr. Saunders.

Bombay, from 1817 to 1846, from a table by Dr. Buist in the British Association Report for 1848. It gives the rainfall of the south-west monsoon months only; but at Bombay the omission of the remaining months is immaterial. That for the subsequent years is taken from the printed volumes of the Colaba Observatory.

Nagpur, from 1826 to 1832, from a paper of Colonel Sykes in the Phil. Trans. From 1855 to 1873 from Mr. Binney's paper on the Amhajari Tank read before the Institute of Civil Engineers in 1874.

Jubbulpore, from 1844 to 1850, from a pamphlet printed by the Board of Revenue, North-Western Provinces; from 1851 to 1874 from the local records furnished to me by Dr. Rice.

Calcutta, from the tabular statements published by Colonel Thuillier in the Journal of the Asiatic Society of Bengal.

It is evident on a simple inspection of the diagram that the fluctuations of rainfall of the three presidency towns show no very striking similarity, and only in the curve for Madras can anything like a general coincidence with the variations of the sun-spot curve be detected by eye.

With a view to ascertain what amount of agreement there is in the annual fluctuations of the rainfall at the different stations, the following tables have been constructed. The first (Table II) shows the difference of each year's rainfall at each station above or below the average of that station, and the second (Table III) taking the stations in pairs, shows in how many years these variations are in the same or in opposite directions at the two stations compared. Now, if the fluctuations which occur from year to year are mainly due to some one cause of general incidence over the whole of tropical India, such, for instance as a deficiency of vapour

in the atmosphere, we may expect that in a large majority of instances, the deviations from the average will be in the same direction; that is to say, there will be a very decided majority of years in which pairs of stations not specially selected, will agree in having a rainfall either above or below the average. The same result will appear if these fluctuations are, in any considerable degree, due to the vapour-bearing winds being generally diverted from the region as a whole, and carried to discharge their vapour burden elsewhere. But if the fluctuations are chiefly due to local causes and are such that a deficiency in one part of the region is on the whole compensated by an excessive fall in some other tract, then we may anticipate that, in a certain majority of instances, the variations will be in opposite directions, provided the stations compared are situated so far apart that they are not likely to be similarly affected by the same merely local causes.

TABLE II.
SHEWING THE FLUCTUATIONS OF THE ANNUAL RAINFALL ABOVE OR BELOW THE LOCAL AVERAGE.

YEAR.	Madras.	Bangalore.	Mysore.	Bombay.	Nagpur.	Jubbulpore.	Calcutta.	YEAR.	Madras.	Bangalore.	Mysore.	Bombay.	Nagpur.	Jubbulpore.	Calcutta.
1813	- 3'40	-	-	-	-	-	-	1845	-10'86	- 2'74	+ 5'16	-18'24	-	- 8'34	- 4'09
1814	-16'10	-	-	-	-	-	-	1846	+31'30	+ 4'60	- 1'74	+14'51	-	+ 5'20	+10'53
1815	+ 7'49	-	-	-	-	-	-	1847	+32'18	+ 2'00	- 3'54	+ 3'04	-	- 8'30	+ 6'45
1816	- 7'35	-	-	-	-	-	-	1848	+ 6'25	+ 4'86	- 2'04	+ 2'80	-	-18'14	- 7'22
1817	+15'05	-	-	+30'03	-	-	-	1849	- 8'70	- 7'64	- 3'54	+41'02	-	- 6'34	+ 4'60
1818	+27'74	-	-	+ 8'10	-	-	-	1850	-11'63	+13'06	+ 7'70	-22'73	-	- 8'67	+10'37
1819	-12'18	-	-	+ 4'93	-	-	-	1851	+15'81	- 0'14	- 6'34	+23'10	-	-14'72	- 1'76
1820	+21'50	-	-	+ 4'37	-	-	-	1852	+24'18	+19'06	+23'80	- 3'70	-	+22'79	+15'50
1821	- 1'38	-	-	+ 9'02	-	-	-	1853	-12'09	- 0'74	+ 8'86	-10'42	-	+ 6'54	-13'83
1822	+11'10	-	-	+39'25	-	-	-	1854	- 5'41	- 5'59	- 8'44	+ 9'17	-	- 0'17	+ 0'56
1823	-21'89	-	-	-11'27	-	-	-	1855	-16'19	- 8'34	+ 4'96	-31'79	-15'04	+ 4'71	+ 4'45
1824	-14'70	-	-	-39'10	-	-	-	1856	- 1'32	+12'86	- 2'14	- 7'05	+ 4'32	- 0'30	- 1'08
1825	+ 7'54	-	-	- 0'73	-	-	-	1857	+ 1'44	- 5'04	+ 1'36	-21'70	- 5'81	- 2'18	+ 3'06
1826	+12'22	-	-	+ 5'52	+16'57	-	-	1858	- 0'01	+ 2'36	+ 1'20	-10'52	- 6'85	-14'24	- 6'16
1827	+39'00	-	-	+ 8'06	+10'97	-	-	1859	+ 6'03	- 3'81	- 1'14	+ 4'64	- 7'64	- 4'25	+ 2'75
1828	-10'62	-	-	+49'01	+ 4'45	-	-	1860	-20'87	- 2'24	+ 1'76	-10'82	+ 3'07	- 4'91	-13'30
1829	-11'04	-	-	- 7'32	+ 8'21	-	- 5'97	1861	-11'32	- 4'00	+ 1'26	+ 3'94	+ 3'85	- 8'23	+23'28
1830	-16'08	-	-	- 1'11	- 9'24	-	- 2'63	1862	-10'33	+ 1'86	+ 6'06	+ 0'06	- 0'22	-14'16	+ 7'57
1831	- 4'16	-	-	+28'56	+23'27	-	- 9'01	1863	+ 6'10	+ 0'96	+ 2'16	+ 4'71	- 2'35	+ 6'19	- 4'76
1832	-30'06	-	-	+ 1'12	- 5'33	-	-15'10	1864	- 1'28	- 1'84	+ 3'26	-27'40	- 7'38	- 7'83	+18'31
1833	-11'40	-	-	- 1'53	-	-	- 5'35	1865	- 6'87	+ 0'56	+ 1'66	+ 4'68	+ 2'52	+ 7'16	- 4'33
1834	- 9'51	-	-	- 2'50	-	-	+ 2'82	1866	+ 2'88	- 1'61	+ 6'16	+ 5'17	+ 1'07	- 6'15	- 0'17
1835	- 7'04	-	-	-10'36	-	-	+19'69	1867	-24'14	+28'35	- 0'54	-10'67	+15'71	+19'84	+ 6'92
1836	- 3'75	-	-	+14'54	-	-	-20'25	1868	- 7'08	- 2'98	+ 0'23	-10'85	-10'55	-24'46	+25'58
1837	+ 0'75	+ 8'86	- 6'24	- 8'39	-	-	-22'30	1869	-16'20	+ 4'97	+ 2'43	+18'69	- 8'60	+ 9'61	- 3'91
1838	+ 3'82	-19'44	- 8'74	-22'10	-	-	-12'92	1870	+25'59	- 6'40	+ 6'69	- 0'76	- 0'41	+24'62	- 5'05
1839	+ 4'56	- 3'04	-	+ 0'65	-	-	- 0'94	1871	+ 7'84	- 6'34	- 1'56	-32'39	+ 4'71	+ 5'96	+27'40
1840	+10'14	- 5'24	-13'14	- 9'82	-	-	- 6'50	1872	+25'16	+ 5'31	- 2'09	+ 3'51	- 1'10	+13'03	-14'86
1841	+ 9'81	+ 2'56	+ 1'18	- 1'48	-	-	- 5'06	1873	+ 3'32	- 6'31	- 7'52	- 3'27	-11'41	- 7'15	-20'64
1842	-12'03	- 4'24	- 5'74	+22'19	-	-	+10'21	1874	+14'39	+21'10	+ 0'15	+ 9'21	- 1'16	+33'67	- 4'43
1843	+ 1'77	+ 1'76	- 6'34	-13'70	-	-	- 1'57	1875	-11'39	-18'38	- 8'72	+11'50	+12'82	- 1'03	- 0'02
1844	+16'85	- 1'04	+ 5'66	- 7'57	-	-	+ 7'93	1876	-26'79	-18'10	- 6'92	-22'06	- 4'02	+ 3'37	+14'32

TABLE III.
SHEWING THE NUMBER OF YEARS IN WHICH THE FLUCTUATION OF THE RAINFALL COINCIDED OR DIFFERED AT THE STATIONS TAKEN IN PAIRS.

Pairs of Stations	Total Years compared.	Years of similar Variation.	Years of Opposite Variation.
Madras and Bangalore -	40	22	18
„ „ Mysore -	39	15	24
„ „ Bombay -	60	34	26
Bombay „ Mysore -	39	16	23
„ „ Bangalore -	40	23	17
„ „ Nagpur -	39	17	12
„ „ Jubbulpore -	22	15	17
„ „ Calcutta -	47	23	24
Calcutta „ Madras -	47	20	27
Total -	—	185	188

Assuming that the data here tabulated are sufficient to afford some criterion of the laws of rainfall variation,

it appears from Table III. that cases in which the deficient or excessive rainfall in one part of the country is more or less compensated by the opposite fluctuation in some other part of the country, and those in which the deficiency or excess is simultaneous at a pair of distant stations are about equally common. A more detailed examination of the rainfall of the 22 years, for which we have seven stations, shows that on an average 63 per cent of the stations vary in one direction and 37 per cent in the other, in each year.

Since 1836 (up to which date we have less than five registers) Table II. shews not a single year in which the rainfall has been either below or above the average at all the stations recorded. At the same time, several years may be pointed out, in which there was a considerable deficiency or excess at most of the stations simultaneously, and some in which a deficiency at one or more of the stations was to a certain extent compensated by an equally marked excess elsewhere. Thus, in 1837, 1838, 1845, 1855, 1860, and 1876, there was a more

The years 1837 and 1838, and 1860, were years of maximum Sun spots; 1845, 1855, and 1876, within one or two years of minimum spots. 1870 was a year of maximum, and 1852 and 1874 fell midway between the maximum and minimum years.

or less serious deficiency at the majority of the stations enumerated; in 1852, 1870, and 1874, as striking an excess. The tabulated rainfall of the years 1842, 1850, 1868, 1871, 1872, and 1875 is characterized by great inequalities, some stations shewing a fall greatly above the average, and others below it. These remarks, be it observed, have reference to the whole of India lying within the tropics. If, however, we restrict our attention to the three stations of Southern India—Madras, Bangalore, and Mysore—we find no evidence of any greater coincidence or regularity, for Table III. shews that, while at Bangalore the fluctuation agrees with that of Madras in twenty-two years, it is in the opposite direction in eighteen years; and at Mysore, somewhat nearer the west coast, the fluctuation agrees in fifteen years only, and differs in twenty-four.

These registers seem to shew that the fluctuations of the rainfall registered at the Madras Observatory are no criterion of the existence of similar fluctuations over Southern India generally, and perhaps such a result was to be expected, since the high ground of the western half of the peninsula receives its chief rainfall during the summer months; while the rainy season of Madras and the Carnatic generally is from October to December. The rainfall of the Carnatic and the Northern Circars may be expected to vary more or less *pari passu* with that of Madras, but I have at present no other register for this tract.

The above is perhaps sufficient to shew that the

generalizations on rainfall of Dr. Hunter's pamphlet probably require some modification and limitation, inasmuch as he extends to Southern India generally conclusions deduced solely from the registers of the town of Madras; and this procedure appears to be unjustified. But since it may nevertheless be true that there is a marked deficiency in the rainfall of Southern India about the epochs of minimum sun-spots, although not necessarily in the same years as at Madras, it will be more satisfactory if we analyze the whole of the data in the same manner as Dr. Hunter has done for those of Madras. This is done in the following tables.

The first of these (Table IV.) shews for each station separately the average annual excess or deficiency of the rainfall, in each year of the eleven-year cycle, as compared with the general average for that station; and also the number of years from which each average has been obtained; and in the final column, the average of Wolf's sun-spot numbers. The figures for rainfall in the different columns are, of course, not comparable with each other, since an excess of, say, 20 inches at Madras, on its general average of 18.51 inches, indicates a much wetter year than the same excess at Bombay with an average of nearly 73 inches. In order, therefore, to admit of these particular results being compared and combined, Table V. has been computed, which gives the average excess or deficiency in the form of a per-centage of the general average rainfall of each station.

TABLE IV.

AVERAGE EXCESS OR DEFICIENCY OF RAINFALL AT EACH STATION FOR EACH YEAR OF THE ELEVEN-YEAR CYCLE

	MADRAS.		BANGALORE.		MYSORE.		BOMBAY.		NAGPUR.		JUBBULPORE.		CALCUTTA.		Average Sun-spot Numbers.
	Years.	Diff. Inches.	Years.	Diff. Inches.	Years.	Diff. Inches.	Years.	Diff. Inches.	Years.	Diff. Inches.	Years.	Diff. Inches.	Years.	Diff. Inches.	
1860, &c.	6	+ 2.44	4	- 8.92	4	- 3.02	5	- 3.08	3	+ 6.25	3	- 1.76	4	+ 1.44	78.9
1861	6	+ 1.87	4	+ 2.83	3	+ 2.12	6	+ 10.84	3	+ 2.40	3	- 0.99	4	+ 4.46	68.0
1862	6	+ 5.84	4	- 2.46	4	- 5.01	6	+ 1.91	3	- 3.14	3	- 12.01	5	- 5.46	54.5
1863	6	+ 4.37	4	+ 10.92	4	+ 7.66	6	+ 2.09	3	- 4.25	3	+ 20.88	5	- 0.40	42.3
1864	6	- 3.34	4	- 5.05	4	- 0.43	6	+ 4.81	3	+ 9.57	3	- 0.97	5	- 0.07	30.4
1865	6	- 11.44	4	- 5.33	4	- 5.01	6	- 1.96	3	- 2.48	3	+ 3.35	5	- 1.24	17.4
1866	5	+ 0.65	3	- 3.67	3	+ 5.69	5	+ 0.76	2	- 7.44	2	+ 2.28	4	+ 1.72	9.6
1867	5	- 13.58	3	+ 12.89	3	+ 0.86	5	- 9.95	2	+ 10.02	2	+ 0.73	4	+ 0.74	11.4
1868	6	+ 0.57	3	- 1.15	3	- 0.03	5	- 13.50	2	- 11.18	3	- 7.12	4	+ 14.69	28.6
1869	6	+ 0.66	3	+ 3.13	3	+ 0.05	5	+ 5.00	2	- 7.75	3	- 4.34	4	- 5.96	56.4
1870	6	+ 9.82	4	- 0.38	4	- 0.68	5	- 0.42	3	+ 2.51	3	+ 0.71	4	- 8.10	85.2
Mean	64	48.51	40	35.44	39	28.94	60	72.97	29	42.04	32	53.26	48	65.91	45.6

TABLE V.

THE SAME AS PER CENTAGES OF THE LOCAL RAINFALL.

	Madras.	Bangalore.	Mysore.	Bombay.	Nagpur.	Jubbulpore.	Calcutta.
1860, &c.	+ 5.0	- 25.2	- 10.4	- 4.2	+ 14.9	- 3.3	+ 2.2
1861	+ 3.9	+ 8.0	+ 7.3	+ 14.9	+ 5.7	- 1.9	+ 6.8
1862	+ 12.0	- 6.9	- 17.3	+ 2.6	- 7.5	- 22.5	- 8.3
1863	+ 9.0	+ 30.8	+ 26.5	+ 2.9	- 10.1	+ 39.2	- 0.6
1864	- 6.9	- 14.2	- 1.5	+ 6.6	+ 22.8	- 1.8	- 0.1
1865	- 23.6	- 15.0	- 17.3	- 2.7	- 5.9	+ 6.3	- 1.9
1866	+ 1.3	- 10.4	+ 19.7	+ 1.0	- 17.7	+ 4.3	+ 2.6
1867	- 28.0	+ 36.4	+ 3.0	- 13.6	+ 23.8	+ 1.4	+ 1.1
1868	+ 1.2	- 3.2	- 0.1	- 18.5	- 26.6	- 13.4	+ 22.3
1869	+ 1.4	+ 8.8	+ 0.2	+ 6.9	- 18.4	- 8.1	- 9.0
1870	+ 20.2	- 1.1	- 2.3	- 0.6	+ 6.0	+ 1.3	- 12.3

Of the six stations here collocated with Madras, Nagpur alone shews any approach to that cyclical variation of rainfall which is so distinctly exhibited in the Madras Registers. The group of years including 1870 is that with the greatest average of sun-spot, that including 1866 represents the epoch of sun-spot minimum. In the former year group the rainfall is *below* the average at most of the stations, and in the latter *above* it, thus reversing the hypothetical order of

relation. Nagpur is, indeed, an exception in both instances—Jubbulpore in the former, and Bangalore in the latter; but on the whole the 1863 group is that of the heaviest, and the 1865 group that of the lightest, rainfall.

The general result is best exhibited by multiplying each of the percentages in the second table by the number of years corresponding to it in the first, adding the several products of the same year and dividing by the sum of the multipliers. By this means each station

contributes to the final result in proportion to the extent of its register, and the result is as follows.—

		Mean Percentage	Mean Sun-spot number.
1860. &c.	- - -	3.1	78.9
1861	- - +	7.1	68.0
1862	- - -	4.5	54.5
1863	- - +	11.8	42.3
1864	- - -	0.1	30.4
1865	- - -	9.5	17.1
1866	- - +	0.9	9.6
1867	- - -	1.3	11.4
1868	- - -	3.8	28.6
1869	- - -	0.6	36.4
1870	- - +	2.6	85.2

The groups of years, including 1861 and 1863, would thus appear to have an excessive rainfall, and that including 1865 (with 1876) a fall much below the average. But anything like a regular cyclical variation is far from distinct, and there can be little doubt that a large part of the anomaly is fortuitous, and owing to the irregular and non-periodic variations being imperfectly eliminated, so that we should rather expect, in future years, a fall somewhat above the average in the 1865 group, and one below it in the 1861 and 1863 groups, with the result of diminishing the average differences shown in the table. That there is, however, a certain cyclical variation underlying the irregularities may be made manifest by the familiar process of taking as a new mean, for each year, the mean of the tabular rainfall of the year itself and half that of the preceding and succeeding years. Dealing with the figures in this way, we obtain the following.—

		Corrected mean, 0.9 per cent.
1860. &c.	- - - +	0.9
1861	- - - +	1.6
1862	- - - +	2.5
1863	- - - +	4.7
1864	- - - +	0.5

		Corrected Mean 4.5 per cent
1865. &c.	- - - -	2.2
1866	- - - -	1.4
1867	- - - -	2.8
1868	- - - -	0.6
1869	- - - -	0.4
1870	- - - +	

Even thus corrected, the figures show irregularities which render it probable that the real cyclical variation is even smaller than that shown by their range in the table, *viz.*, about 9 per cent. And, as a final result, the data now adduced seem to indicate that, taking tropical India as a whole, the rainfall is subject to a certain cyclical variation coinciding in length of period with that of the sun-spot frequency, but that this variation has a range of less than 5 per cent above or below the average; and to no greater extent can the probability of dearth be regarded as subject to a regular periodical increase or decrease. The range of the cyclical variation at the town of Madras itself is, however, very much greater, at least double this amount; it is possible that this is merely local, but it is also possible that the peculiarity may be shared by the Carnatic generally, and by that portion of India (and Ceylon) which receives its chief rainfall at the same season as Madras. I shall endeavour to obtain any rainfall register for long periods that may be extant for important stations in this region, and should they contribute any further information of importance I shall submit a supplementary report.

With respect to famines, the very meagre data adduced in the earlier part of this report seem to show that if they are more frequent in Southern India at the epochs of minimum sun-spots, they are more frequent in Northern India at those of maximum sun-spots; but I am far from regarding the present data as sufficient to admit of any useful generalization.

HENRY F. BLANFORD,

Meteorological Reporter to the Govt. of India.
Calcutta, 18th May, 1877.

NOTES OF EVIDENCE FURNISHED TO THE FAMINE COMMISSION ON JANUARY 30TH, 1879.

By NORMAN R. POOSON, C.I.E., *Sc.*, Government Astronomer, Madras

OUT of the seven or eight hundred thousand fixed stars visible on any fine night with an ordinary telescope of about two inches aperture, a small number are known to show decided and periodical changes in their brilliancy. My attention has been much occupied with this class of celestial objects for thirty years past, during which time their number has been augmented by subsequent discoveries, from fifty-three to one hundred and seventy-six. Many others are suspected to be subject to change, but I speak only of such as are indubitably proved to be variable.

The fact of fluctuations occurring in the light of certain stars has been known from the earliest ages, but the periodicity of such changes only for about two centuries and a half. And while almost every other branch of astronomy has yielded to the patient investigations of its students, this one has so far baffled all attempts yet made to account for the phenomena it presents to our contemplation, that in this present year we can no more explain them than could their first discoverer, Phocylides Holwarda, in 1639.

As a general rule, such periodically variable stars increase in brilliancy more rapidly before attaining a maximum of intensity than they subsequently fade away to a minimum. Some absolutely vanish, in the largest telescopes yet constructed, while others vary so slightly that the change is only to be recognized by very experienced observers. The periods of variation are in many cases marvellously regular, but in a few, fitful and capricious. In duration also they differ widely; the shortest completing its changes in about twenty hours, while some periods extend over many years, and one variable star, conspicuous at noon day, seems to be at a maximum only once in three centuries. Neither is the intensity of light equal at successive maxima. The whole subject, though familiar as a fact, is shrouded in mystery and perfectly inexplicable.

Our sun, if viewed from the nearest of the fixed stars, would be seen only as one of themselves, and would undoubtedly be recognized as a variable star of very slight fluctuation, with a period of about eleven years

and one month. It would present the distinguished characteristics above named, of usually more rapid increase, slower diminution of light, and irregularity of period, as well as of the intensity of its maximum brilliancy. This interesting discovery is due to the persevering records of an amateur astronomer, Louis Schwabe, of Dessau, who commenced his observations in 1826, by simply counting the number of new spots visible each day upon the sun's disc. He found them to be increasing till 1830; diminishing for the next few years, and again rising to a nearly doubly intense maximum in 1837. This, it may be remarked, was the briefest period before or since made known. His first announcement of these important results was given in the "Astronomische Nachrichten," No. 350, in April 1838. Continuing his observations with renewed vigour, another minimum was found to occur in 1843; a maximum in 1848, and a third decided minimum in 1856. He had then made upwards of nine thousand records of about four thousand seven hundred separate groups of sun spots, and conspicuously proved his point, and most worthily received universal acknowledgments of his great discovery; amongst others, the medal of the Royal Astronomical Society of England in 1857, never better bestowed.

Professor R. Wolf, of Zurich, next took up the research, and, by a masterly investigation of all past records of solar spots, and subsequent observations of his own, was able to furnish a table of successive minima and maxima, extending from 1611 to 1867. He also arrived at the further conclusions; that the average period was 11.1 years; that the spots increased in frequency for 4.8 years, and diminished for 6.3 years, and that the duration of the period was considerably irregular; while the activity of the spots was shown to be greater in short periods than in longer ones. The relative positions of our Earth and Venus were found to produce a marked fluctuation in a little more than seven and half months, while a far more important effect, due to the great planet Jupiter, occurred in about fifty-six years or at each fifth spot period.

Frequent memorable, and to me most interesting, con-

versations with my revered friend and master, Manuel John Johnson, Radcliffe Observer at Oxford, who, as President of the Royal Astronomical Society, had to prepare and deliver the address to Professor Schwabe, of Ussan, when the Society's Gold Medal was awarded to him for his valuable discovery, coupled with my own researches upon the variable stars, led me at once to conclude that our sun was a variable star; and, if variable in light, doubtless also in heat; and that hence all our meteorological phenomena, especially temperature and rainfall, must be influenced by its changes. I also foresaw, however, the vast difficulties in the way of arriving at any satisfactory proof of such connection; for, as I then argued with Mr. Johnson, twenty years ago, the effects must be compensating in different parts of the world, and any demonstration of such connection must be based upon polar or equatorial meteorological records, and not upon those made in middle latitudes. My views were completely confirmed by the subsequent failure of several eminent meteorologists, who had naturally jumped at the same surmise, but, overlooking my precautions as to locality, had tried to deduce conclusions from comparing solar phenomena with European meteorological records. Their failure was distinctly foreseen to my mind. The diagram to which I shall shortly request your attention, further proves that Southern India is, by no means, badly situated for realizing the truth of the ideas I entertained *more than twenty years ago*.

Coincidentally with Schwabe's solar researches, Professor Lamont, of Munich, made a similar, but perfectly independent discovery, in regard to terrestrial magnetism. He found that the diurnal range of his magnetical instruments was subject to nearly decadal variation, indicating that some great cosimical influence was at work, hitherto unrecognized, but producing evident maxima and minima of magnetic intensity in a period of about ten years. This he announced in the year 1859. Our own distinguished Sabine was the one to point out the coincidence of the solar spot and terrestrial magnetic effects, and his sagacious recognition of the circumstance was duly investigated and fully confirmed, by Professor E. Gautier, of Geneva, and Professor R. Wolf, then at Berne. A similar periodicity and coincidence of epochs has since been pointed out in auroral phenomena by Dr. H. Fritsch, of Pekin, still further corroborating the evident influence of the solar upon terrestrial phenomena. And, lastly, Mr. Meldrum, of Mauritius, has shown that cyclones are following in the wake of the sun spot curve, subject to a similar law of periodicity.

I next proceed to lay before you my own views as to the way in which the prevalence of sun spots affects the rainfall of this empire, producing exactly contrary effects in Northern and Southern India. Water is well known to be a bad conductor of heat, and hence a small difference in the actual intensity of sunshine will not very materially affect the amount of vapour raised by evaporation from the surface of the ocean. Rock, earth, and sand, being more absorbent of heat, will acquire a much higher temperature from sunshine than the surface of the sea can ever do; and hence, in hot, clear years, the vapour raised by evaporation will pass over the heated, sandy soil, of the Coromandel Coast, without much chance of suffering condensation and release, in the form of rain, until it reaches the cooler, elevated plateaus, or probably, even the snow-capped hill ranges of Northern India. Hence, drought and scarcity in Southern India should be marked by excessive rainfall and floods in higher latitudes. On the contrary, when the land is less heated by direct sunshine in the southern portion of India, rain will fall more readily; the clouds will be relieved of their excessive load of aqueous vapour, and so our years of excess, especially in the eastern districts of the Madras Presidency, will be marked by corresponding deficiency in Upper India.

I am strongly inclined also to suspect another cause, not generally thought of, may be at work, powerfully co-operating to produce similar effects. It was an old remark of the veteran aeronaut, Green, who, if not a man of scientific reputation, was certainly a shrewd observer of natural phenomena, that whenever he made one of his balloon ascents on a cloudy day when rain was not falling, he invariably found, that after passing through the lower cloud stratum, the sun was shining brightly upon its upper surface. On other occasions it would sometimes happen, that in order to keep faith with his public engagements, he felt obliged to go up in uncomfortable drizzling rain, not sufficiently severe to countenance a postponement of his performance; and at such times, he generally found a second and much higher cloud stratum was effectually sheltering

the lower clouds from the solar influence. This observation was, I believe, fully corroborated in the scientific balloon ascents of Mr. Welch and Mr. Glaisher, made on behalf of the British Association of Science. Now the lower clouds are undoubtedly those formed by direct evaporation from the Indian Ocean, and are far more subject to disturbance by surface winds and local circumstances; while the upper stratum will be less affected by such casual local influences, may be brought from a much greater distance by the far more steadily flowing upper currents of the atmosphere, and may possibly be, like terrestrial magnetism and auroral phenomena, subject to a periodicity of intensity varying with the frequency of the solar spots. In such case we need no longer feel surprised, that in some seasons, our monsoon clouds, which are our chief source of rainfall in the Madras Presidency, though apparently well charged with the much needed nature restoring supply of vapour, pass away, leaving us in distress and famine emergencies, to produce mischievous floods and destruction of crops in higher latitudes. People are much too apt, in regarding India as a whole, to overlook its vast extent, and to forget that its southern portion is inter-tropical, while upper India is not only in the north temperate zone, but is further aided in its meteorological reversing powers, by the lofty elevation of its mountain ranges.

It would be highly interesting and important to know, but I have no available sources of information upon the subject, whether an analogous course of events does not prevail in the somewhat similarly situated, but far grander continent of South America. A comparison of rainfall at some places on the coasts of Pernambuco and Bahia with others in southern central Brazil, especially approaching the Cordillera range, should, if my views are well founded, shew a repetition of what we experience in India.

At Madras, for such limited period as black bulb thermometers in vacuo have been in use, it is pretty evident that sunshine has recently been hottest in years when there are fewest sun spots, and I think that Professor Gautier, of Geneva, held the same opinion. I believe that this will be found to be the case generally near the equator, but that if my upper cloud stratum notions have any truth in them, a contrary result may be deducible from the readings of the same instrument in temperate latitudes. Mr. Blanford and many other eminent meteorologists maintain that the solar heat is greatest when sun spots are most frequent, but this is precisely what I should expect under the reversed conditions of their geographical positions.

The black bulb thermometer in vacuo is a very valuable rough and ready instrument, but there are some points about it not yet explained. For instance, it is affected by light as well as by heat, which does not appear to be generally known. If comparisons are made between a black bulb in vacuo and an ordinary standard dry bulb at night, say at 10 p.m., and they are found to agree within a small and pretty constant limit; no matter what precautions may be taken to secure the black bulb from direct or reflected sunshine, comparisons in day light will show an unsteady difference of from four to seven or eight degrees. Sir John Herschel's Actinometer might be a better means of investigating solar heat, but the process is too slow and troublesome ever to find favour, and so far as I know, no records of such an instrument have ever been made by any one throughout a complete solar spot period of eleven years, especially not where such observations are most important, at a station well within the torrid zone.

The time has not yet arrived, at which, by our knowledge of the subject, years of famine and distress due to great deficiency of rainfall can be systematically predicted with anything like the certainty of astronomical phenomena in general; but when, as during the last twelve years, the sun spot curve is moving in marked accordance with the interpolated rainfall curve and the fluctuations of the former are unusually marked, scarcity may undoubtedly be seriously feared and prepared for in this part of the Madras Presidency, about the epoch of fewest sun spots. It unfortunately happens that our estimate of least solar activity in spot formation is limited by a total absence of these natural indications of solar change; and hence, maintaining as I do, that absence of spots means greatest solar energy and their prevalence a diminution thereof, it is evident that we have less means of comparing the sun's relative intensity at the epochs of minimum spots than at those of maximum; or in other words, that while we are able to appreciate in our solar curve the varying height of the maxima, all our minima appear to be tolerably

similar; bounded by the zero record of "no spots." In nearly all cases of variable star curves it is the epoch of greatest brilliancy, in their case the maximum of the curve and corresponding to our solar minimum, which is by far the most fluctuating and irregular, and I believe that if observation enabled us to form any notion of the increase of solar intensity beyond that at which spots began to appear as indices of its diminution, the minimum points of the solar curve would often make a sharp and sudden descent below zero, especially in years of deficiency in rainfall within the torrid zone. I am not inclined to accept the apparently greater height of the solar maxima since 1845 as actual proof of increased spot activity, or as I regard it of diminished solar intensity, but simply as the result of the groups having been more carefully counted since that time and smaller ones allowed to swell up the records, which in earlier years, with the toy telescopes then employed, were considered too insignificant to be counted. I look for the next epoch of deficiency of rain in southern India between 1888 and 1891, but probably for none so bad as that recently endured until the next high epoch of solar spot minimum, due about 1932.

In my Administration Report to the Madras Government for 1874-75, I made the following remark, "Five consecutive years of excess having now been experienced, the evident periodicity of tropical rainfall renders it probable that some years of corresponding deficiency may be expected." This since fully verified prediction, though duly printed in the spare copies of my Report, was suppressed by the compiler of the annual Volume of Administration Reports for 1874-75. It is to be regretted that suppressions in and alterations of the Observatory Reports are ever permitted without the Astronomer being allowed a voice in the matter.

Let it be remembered, however, that my remarks apply only to inter-tropical India, and that if my views are correct, the condition of northern India must ever be the reverse of what we have reason to expect here. In another three years we shall no doubt be grumbling at excessive rainfall; while the cry of distress and scarcity will be from the north; but at each epoch of maximum or minimum I believe one or other part of India will suffer more or less, and that the intermediate years are alone those in which general immunity from famine can be relied upon.

In Table 1 will be found the data from which the accompanying diagram of curves, illustrating the very strikingly intimate connection between sun-spot frequency, rainfall, and grain prices in Madras, has been formed.

Column 1 indicates the year up to the end of which the sun spot and rain registers refer, but the grain prices being given for the official instead of the calendar year are three or four months behind. The slight difference of 0.3 of a year has not been allowed for in the projection.

Column 2 gives Wolf's Relative numbers, from the "Astronomische Nachrichten," No. 1717, &c.; indicating the proportional frequency of the solar spots in various years, from 1800 to 1877.

Column 3 contains the actual rainfall measured at Madras from 1803 to 1878, omitting four doubtful years, 1808, 1809, 1810 and 1812, when, in the absence of the Astronomer, the registers of all kinds were evidently unreliable. The irregularity of the successive annual registers of rain-fall is chiefly due to cyclonic disturbances; for while some years' returns are unduly exaggerated by an abnormal addition to the register from the effects of a cyclone at or near Madras, it is manifest that in other cases the result of far distant cyclones, especially those northward of Madras, as at Masulipatam or Vizagapatam, must be to divert our upper air current to restore the atmospheric equilibrium suddenly depressed at such stations, carrying away the upper cloud stratum, and so preventing the lower clouds from depositing rain while their upper surface is exposed to sunshine. The last two years in the Table are striking examples of these contrary effects. In May 1877, a purely cyclonic rain-fall in May added twenty-one inches abnormally to the annual amount, and a similar quantity in November was also chiefly cyclonic. Deducting these, the register for the year would have been twenty-four instead of sixty-six inches. In 1878 again, the total fall was only twenty-eight inches, when but for the atmospheric drainage occasioned by the two

successive Vizagapatam cyclones of November and December it would very probably have reached nearly fifty inches.

The numbers in column 4 are obtained from those in column 3 by an interpolating or smoothing process, which to a considerable extent eliminates this irregularity, by distributing and sub-dividing such casual excesses and deficiencies between preceding and following years. The numbers in this column are found by adding the rain-falls in the preceding and following years to twice that of each current year and dividing by four. It is true that the actual intensity of maximum and minimum years of rain-fall is thus toned down and range naturally diminished, but the general law of rise and fall of the curve and the dates of maxima and minima are rendered far more evident and will not be vitiated by the process, which is one frequently applied to the consideration of irregularly periodical phenomena, and is especially necessary in discussing the light curves of variable stars.

Column 5 furnishes the price of paddy per garce of 3200 Madras measures, from the Revenue Board Returns, the mean being taken between the prices of the first and second sorts of grain. In column 6 these prices have been subjected to the same allowable and necessary smoothing process just described as applied to the rain-fall returns.

In the diagram, the years are indicated above and below. In the upper curve the bars indicate the relative frequency of the sun spots, and the waving line is drawn strictly through the tops of the bars without any smoothing process; the object in view being to shew the actual irregularities in the solar changes, which are, however, so progressive as not to require toning down to deduce the successive epochs of maximum and minimum. In the middle projection of rain-fall, and the lower one of grain prices, while the bars represent the actual and very irregular annual numbers, the curves are traced through the interpolated or smoothed points, given respectively in columns 4 and 6 of Table 1. The successive corresponding maxima and minima are connected by dotted lines.

It will be at once seen on inspection, that although the successive maxima and minima of sun spots and rain-fall are not strictly correspondent as regards time, sometimes one and sometimes the other taking priority, the succession is perfect and unbroken so far throughout this century. Intermediate rising and falling of the rain-curve is sometimes observable while the frequency of the sun spots is diminishing, especially about the years 1849-52 and 1861-63, but a glance at the solar curve shews that it is itself subject to slight arrest and fluctuation during its descent; and that the rain curve, in its very deviations from apparent order and regularity, is but obeying the solar impulses, and that too in so marked a manner as to render these sympathetic intermediate bends almost as striking a verification of the physical connection between the two phenomena as the unbroken succession of the maxima and minima themselves.

Table 2 shews the dates and values of the maxima and minima furnished by the three curves. For sun spots and rainfall each date read off the curve has been increased by 0.5, and for grain price by 0.7, in consideration of what was stated with reference to column 1 of the preceding table.

Mathematical formulæ of interpolation, though beautifully symmetrical and incomparably superior wherever applicable, often obscure rather than illustrate such irregular curves as those with which we have to deal, whereas simple projection conspicuously points out the very peculiarities which the more elegant analytical process would only disguise. The paddy price curve shews, as might be expected, the inevitable rise in the cost of grain corresponding to each minimum year of rain-fall, though too often a very acceptable improvement in the rainfall was not followed by a corresponding reduction in the price of paddy. Indeed it is well worthy of remark that the maximum price (Rupees 119) shewn by the curve in 1846, is lower than any price on record since 1853, and the maximum of 1855, after a very rapid rise, is only four Rupees above the next intermediate fall and actually five Rupees less than the periodical minimum of 1859, which, though geometrically indicated by a slight descent on the curve followed by a rapid rise, was certainly no minimum agreeably to the popular notion conveyed by such an expression.

TABLE I.

Year.	Sun-spot Frequency from Wolf's relative Numbers.	Annual Rainfall in inches at the Madras Observatory.		Mean Price of Paddy in Rupees per Garco of 3,200 Measures in Madras District.	
		Actual.	Interpolated.	Actual.	Interpolated.
1800	10.1	—	—	—	—
1801	30.9	—	—	—	—
1802	38.3	—	—	—	—
1803	50.0	66.1	—	—	—
1804	+70.0	31.1	39.0	—	—
1805	50.0	31.2	38.8	—	—
1806	30.0	61.5	42.1	—	—
1807	10.0	14.3	—	—	—
1808	2.2	—	—	—	—
1809	0.8	—	—	—	—
1810	-0.0	—	—	—	—
1811	0.9	39.7	—	103.0	—
1812	5.4	—	—	158.5	140.5
1813	13.7	45.1	—	142.0	138.7
1814	20.0	32.4	41.5	112.5	114.9
1815	35.0	56.0	46.4	92.5	96.4
1816	+45.5	41.2	50.5	88.0	91.5
1817	43.5	63.6	61.2	97.3	92.1
1818	34.1	76.3	+63.1	85.7	88.7
1819	22.5	26.3	54.7	86.0	85.0
1820	8.9	70.0	55.9	82.3	88.2
1821	4.3	47.1	56.0	102.0	98.1
1822	2.9	59.6	48.2	106.0	122.6
1823	-1.3	26.6	-36.6	176.5	166.2
1824	6.7	33.7	37.5	205.7	184.1
1825	17.4	56.1	51.6	148.1	151.3
1826	23.4	60.7	66.5	102.3	108.3
1827	39.9	88.4	+68.9	80.0	87.7
1828	52.5	37.9	50.3	88.5	89.6
1829	53.5	36.9	36.0	101.3	98.3
1830	+59.1	32.4	36.5	101.5	95.5
1831	38.8	44.4	34.9	77.5	94.4
1832	22.5	18.5	-29.6	121.0	116.8
1833	-7.5	37.1	32.9	147.5	130.1
1834	11.4	39.0	39.1	104.3	111.9
1835	45.5	41.5	41.7	91.3	95.6
1836	96.7	44.8	45.1	95.3	94.4
1837	+111.0	49.3	48.9	95.7	98.4
1838	82.6	52.3	51.7	106.7	100.9
1839	68.5	53.1	54.3	94.5	94.9

TABLE I.—continued.

Year.	Sun-spot Frequency from Wolf's relative Numbers.	Annual Rainfall in inches at the Madras Observatory.		Mean Price of Paddy in Rupees per Garco of 3,200 Measures in Madras District.	
		Actual.	Interpolated.	Actual.	Interpolated.
1840	51.8	58.7	+57.2	84.0	81.4
1841	29.7	58.3	52.9	63.0	70.0
1842	19.5	56.5	-45.4	70.0	68.1
1843	-8.6	50.3	50.6	69.3	72.7
1844	13.0	65.4	54.7	82.0	90.1
1845	33.0	37.7	55.1	127.0	113.1
1846	47.0	79.8	69.6	116.5	112.4
1847	79.4	81.0	+74.1	89.5	90.2
1848	+100.4	54.8	57.6	65.3	72.8
1849	95.6	39.8	-42.8	71.0	72.0
1850	64.5	36.9	44.5	80.7	75.6
1851	61.9	64.3	59.6	70.0	71.1
1852	52.2	72.7	+61.4	63.7	76.2
1853	37.7	35.8	46.9	107.5	103.4
1854	19.2	43.2	-38.6	134.7	129.4
1855	6.9	32.3	38.7	140.7	131.9
1856	-4.2	47.0	44.8	111.5	125.8
1857	21.6	53.0	50.4	139.3	134.7
1858	50.9	48.5	+51.3	148.5	139.7
1859	96.4	55.1	46.6	122.5	135.6
1860	+98.6	27.6	36.9	149.0	147.6
1861	77.4	37.2	-35.0	170.0	164.6
1862	59.4	38.2	42.0	169.5	168.1
1863	44.4	54.6	+48.7	163.5	167.0
1864	47.1	47.2	47.7	171.5	174.5
1865	32.5	41.6	45.5	191.5	196.1
1866	17.5	51.4	42.2	230.0	213.1
1867	-8.0	24.4	35.4	201.0	212.3
1868	37.3	41.4	-34.9	217.0	206.6
1869	73.9	32.3	45.0	191.5	182.6
1870	+139.1	74.1	59.2	130.5	141.6
1871	111.2	56.4	+65.1	113.7	119.9
1872	101.7	73.7	63.9	121.7	126.7
1873	66.3	51.8	60.1	149.5	141.0
1874	44.6	62.9	53.7	143.3	147.2
1875	17.1	37.1	39.7	152.7	173.6
1876	-11.3	21.6	-36.6	245.5	231.0
1877	12.3	66.3	45.7	280.3	271.9
1878	—	28.7	—	281.5	—

TABLE II.

MAXIMA AND MINIMA RESULTS FURNISHED BY THE THREE CURVES.

Sun-spot Frequency.			Madras Rainfall.			Price of Paddy per Garco.		
Event.	Date.	Frequency.	Event.	Date.	Inches.	Event.	Date.	Rupees.
Max.	1804.5	70	Min.	—	—	Max.	—	—
Min.	1810.5	0	Max.	1809.6	27	Min.	1812.7	140
Max.	1816.9	47	Max.	1818.1	65	Min.	1820.0	76
Min.	1823.0	2	Min.	1824.1	35	Max.	1824.8	183
Max.	1830.5	60	Max.	1827.1	70	Min.	1828.1	83
Min.	1834.0	6	Min.	1832.5	30	Max.	1833.7	130
Max.	1837.6	112	Max.	1840.5	58	Min.	1842.6	68
Min.	1843.8	5	Min.	1842.5	45	Max.	1846.1	119
Max.	1848.8	103	Max.	1847.7	74	Min.	1849.2	71
Min.	1856.3	4	Min.	1855.0	36	Max.	1855.6	132
Max.	1860.0	100	Max.	1858.2	52	Min.	1859.8	137
Min.	1867.5	9	Min.	1868.2	34	Max.	1867.2	215
Max.	1870.5	140	Max.	1871.5	65	Min.	1871.7	120
Min.	1876.6	11	Min.	1876.1	35	Max.	1877.7	283

II.—AGRICULTURAL STATISTICS.

By Mr. C. A. Elliott, C.S.I., Secretary to the Commission

SECTION I.

SHewing WHAT STATISTICS EXISTED FIVE YEARS AGO, AND HOW THEY WERE PREPARED.

1. Three important despatches have been received from the Secretary of State during the last five years on the subject of the improvement of agricultural statistics and of the system under which they are collected.

The Questionnaire of the International Statistical Congress.

2. With a despatch, dated 5th February 1874, the Secretary of State forwarded a set of questions and forms, issued by the Ministry of Agriculture and Commerce in France, on behalf of the International Statistical Congress, with a view to obtain comparative agricultural statistics in the principal countries of the world. The *Questionnaire* was divided into four parts—

Part I., on the distribution of area, was to show the total area of cultivated, fallow, pasture, forest, and unculturable land.

Part II., required the area, seed, and out turn per acre, for each kind of crop.

Part III., statistics of domestic cattle and of their produce.

Part IV., the number of cultivating and proprietary tenures, and their area: the number of ploughs and the system of rotation.

3. In forwarding the questions, the Secretary of State wrote as follows:—

" 2. I am aware that, in the present state of British India, many of the particulars included in the present forms cannot be obtained, and that in other respects those forms may be more or less inapplicable to Indian conditions and to the existing classifications of Indian statistics; but the object is so important that I am anxious to place at the disposal of the Congress all the information which may be available * * * so far as this can be done without the creation of new machinery and the setting on foot new and special inquiries.

* * * * *

" 4. I do not forget that it was distinctly stated at the time of the proceedings of the statistical inquiry in 1866, "that complete and accurate results could only be obtained very gradually; but considering that seven years have now elapsed since Sir S. Northcote's despatch" sanctioning the proceedings of the inquiry "was written, and that in the meantime a new department has been created at Calcutta, one of whose special functions was the supervision of the statistics of India, I cannot help hoping that greater progress has been made towards the general adoption of the forms then prescribed than would appear from the information that has reached me.

" 5. In expressing the hope that Your Excellency will be enabled in some degree to meet the views of the International Congress from materials at the disposal of your Government, I take the opportunity of directing renewed attention to the questions under consideration at the time of the correspondence to which I have referred; and I request to be informed what steps have recently been taken, and what progress has been made towards the systematic and general adoption of the recommendations of the Statistical Committee of 1866.

" 6. Great as is the importance of comparative statistics in the case of different countries, it is obvious that they are of still greater importance as between different provinces and districts of one and the same Empire; and I should be glad to be able to show to the International Statistical Congress that, within the limits of their own dominion, the Government of India had already, in some degree, accomplished the task which, on a large scale, the Congress has just commenced."

Paragraphs 2 and 6 of this despatch were communicated by the Government of India, on the 25th January 1875, to all the Local Governments and Administrations, with a request that steps may be taken to fill up the forms as far as possible.

The tables printed at the end of this section shew how

far the different provinces were able to supply the information asked for. The reply of the Punjab Government was the most complete of all, while the Government of the North Western Provinces professed itself incapable of furnishing any information whatever.

Keeping of Village Records and Statistics.

The second of the three despatches (dated 27th August 1874) contained the following remarks:—

" Your Excellency's Government will doubtless have watched with interest the tentative measures adopted in certain districts of Bengal, with the object of collecting agricultural information. They will have noticed, among the papers above referred to, the note by the Officiating Secretary to the Board of Revenue in the North Western Provinces, proposing the adoption of a plan for securing the same object.

" 2. The subject is one of considerable importance, and is well worthy of the careful attention which it has recently received. In some parts of India the machinery already exists by means of which correct village records, including statistics, may be maintained and utilized. In the Bombay Presidency, if the rules laid down in the Manual of Revenue Accounts are observed, the result must be a satisfactory record of agricultural statistics. In Bengal, owing to various causes, the difficulties are considerable. But in the North-Western Provinces machinery analogous to that in the Bombay Presidency is available, and only appears to require systematic supervision.

" 3. I trust that the subject will receive attention from your Government, and I shall be glad to be informed of any steps that may be taken by the Board of Revenue in the North-Western Provinces to secure the maintenance of correct and uniform agricultural records, the necessity for which has been rendered so evident in the course of the recent operations and discussions connected with the re-settlement of districts under that Government. I desire that copies of books analogous to Mr. Hope's *Manual of Bombay Revenue Accounts*, which is in use in the North-Western Provinces and the Punjab, may be sent home for information."

This despatch was forwarded by the Government of India (1st October 1874) to the Governments of the Punjab and the North-Western Provinces for report, remark, and suggestions.

17. But in the meanwhile, the note by Mr. Buck, referred to by the Secretary of State, had been occupying the careful attention of the North-Western Provinces Government, and on the 28th November 1874, the Lieutenant-Governor, Sir J. Strachey, wrote a minute proposing the formation of a Department for collecting and arranging statistics of trade and agriculture in these provinces, and the appointment of an officer to be designated Director of Agriculture and Commerce, on a pay of Rs. 1,800 a month, with a fixed monthly travelling allowance of Rs. 250, both sums being defrayed from provincial revenues. The minute was read "with great interest" by the Government of India, and the proposal was "cordially sanctioned." The proceedings were reported to the Secretary of State (22nd January 1875), and his Lordship, in confirming the proceedings (29th April 1875), wrote as follows to the Government of India:—

" 2. The question has for some time been under my consideration in what manner greater effect might be given to the intentions of the late Earl of Mayo in proposing to Her Majesty's Government the formation of the Department of Revenue, Agriculture, and Commerce. The object aimed at was the possession of a specific branch of the administration, whose prime duty it should be to suggest measures for the development of agricultural industry in India; and one part of this duty was to consist of the collection of statistics which might throw light on questions of agriculture, and to watch the progress of commercial legislation and the fluctuations of trade, with

" reference especially to the exportation of agricultural produce and the improvement of the resources of the country.

" 2. Such works as this must, however, be chiefly left to the local authorities in the various provinces, and under supervision by the central department in Calcutta can only be of a very general character.

" 4. It is with great pleasure that I have read Sir John Strachey's minute forwarded with your letter under reply, in which he proposes the formation, in the North-Western Provinces, of a special provincial department for the collection of statistics, the direction of experiments for agricultural improvement, and the suggestion of measures calculated to further the progress of trade or improve the condition of the agricultural classes. He very rightly points to the excellent machinery which exists in the village accounts, if only they were efficiently organized, for the collection of trustworthy agricultural records.

" I trust that in other provinces also this example may be followed, and that before long it may be found possible to compile, for the whole of British India, statements which will convey, in a general manner, an approximately accurate idea of the condition of cultivation throughout the province, and which will prove useful in the solution of the numerous problems of administration in which the want of trustworthy information of that character is now so seriously felt."

" 18. Since the creation of this appointment the attention of the Director (Mr. Buck) has been mainly given to three subjects:—

(1) The improvement of the agricultural statistics.

(2) The collection of trade statistics.

(3) The introduction of new staples and of improvements in the system of agriculture.

Only the two first heads are touched on in the present note.

" 19. The first step was to create a supervising staff of *Kanungos*, intermediate between the *Patwari* and the *Tahsildar*, whose sole duty it should be to ensure the prompt and accurate preparation of the village records. One of these officials has been appointed to every 50 or 40 *patwaris*, and there are altogether about 20,000 *patwaris* in the north-western provinces.

" 20. The next step was to draw up a set of rules for *Patwaris* and *Kanungos* which, being adopted by the Board of Revenue and the Local Government, and issued as rules under Act XIX of 1873, have the force of law. These rules contain a complete set of accounts and records for each village, containing all necessary statistical information as to area, crops, rental demand, and collection, classification of holdings and tenancies, and transfers of land. They provide for the annual rectification of the village field maps, so as to represent all changes in cultivation, irrigation, &c., and for the compiling and totalling up of this information by *tahsil* and by districts, and also for the appointment, education, and punishment of the *patwaris* and *kanungos*. Additional rules are now being drawn up to provide for the efficient supervision of the system by the higher native and European officials. With the strong and active superintendence of the district staff, there is every hope of success; and when the system is in perfect working order it should secure the formation of a series of records which will give the most ample statistical information that can be required for the purpose of testing the agricultural condition and progress of the people, or for judicial evidence of their landed rights.

" 21. Mr. Buck writes:—"The systematisation required has not been conceived without great labour and difficulty, and that necessary amount of opposition which attends every reform. The whole code of rules, a copy of which accompanies this note, occupied some months in preparation and arrangement in consultation with revenue officers, and were not brought into operation until 1877, when the drought coming, completely disturbed the working of the machinery. 1878 is the first year in which steady work can be said to have been begun."

" 22. The system has not yet been extended to Oudh. The progress, however, that has been made already in the North-Western Provinces is shown by the fullness of the information which is contained in the following section, and which compares favourably with the answers made by the Government of the North-Western Pro-

vinces in 1875, professing their inability to give any statistics whatever.

" 23. On the 31st May 1875, the Punjab Government replied to the Government of India's communication of the 1st October 1874, by shewing what returns they actually kept up; they are the following:—

1 Area cultivated and uncultivated	- - -	Quinquennial.
2 Crops	- - -	Annual.
3 Rates of rent and produce	- - -	- - -
4 Stock	- - -	Quinquennial.
5 Enhancement of rent payable by tenants with right of occupancy	- - -	Annual.
6 Transfers of land, showing selling price, &c.	- - -	- - -
7 Rainfall	- - -	- - -
8 Prices of produce	- - -	Quinquennial.
9 Labour	- - -	- - -
10 Prices current	- - -	Annual.
11 Cattle fairs	- - -	- - -
12 Tenures of land held and not held direct from Government	- - -	- - -

The machinery for drawing up the first six of these statements was primarily the *patwari*, and over him the *kanungo*, whose functions are defined by the rules under the Punjab Land Revenue Act of 1871. Over the *kanungo* is the *tehsildar*, who works under the direction of the deputy commissioner. For the returns 7, 8, 9, 10, and 12, the *tehsildar* is primarily responsible. Every effort, they said, is made to secure accuracy in these returns, and these efforts will be more successful when the new scheme of judicial establishments is sanctioned and the *tehsildars* relieved of civil cases. On this being effected, one of the first measures of the local government would be to impress upon district officers the importance of devoting more time and attention to the preparation of the agricultural statistics of their districts.

Regular Collection and Systematic keeping of correct Agricultural Statistics.

" 24. The Secretary of State, on the 24th June 1875, again called attention to "the great importance of possessing accurate information respecting the agricultural statistics of India * * * where so large a portion both of the Government revenue and of the public wealth is directly dependent on the land."

"In many provinces," his lordship went on to say, "machinery exists which appears suitable for the collection of the needful materials, and much information of the nature in question is indeed already obtained and recorded. What, for the most part, seems to be principally required is increased attention to the methods of checking and combining the statements now prepared * * *."

With this dispatch the Secretary of State sent copies of a report submitted by the Special Statistical Committee that was sitting in the India Office, and said that it will serve as a guide to the Department of Revenue, Agriculture, and Commerce, whenever that department is able to deal with this important branch of its work. With reference to the amount of detailed clerical work that would be entailed on executive officers in the preparation of more useful returns, he observed that the machinery existing in the villages, in most parts of India, appeared to be sufficient, under proper directions, for the purpose of recording the information; but when collected, the figures should be examined, and proper endeavours should be made to correct errors, instead of as at present throwing away the labour expended in their preparation by a sweeping paragraph in the Administration Reports denouncing the returns as useless. His dispatch ended by saying that he would be glad to learn what steps the Government of India proposed to take for obtaining more accurate information regarding the condition and extent of the agriculture of India, either by an extension of the plan commenced in the North-Western Provinces, or in any other manner which the Governor-General in Council would deem more suitable for local requirements.

" 25. The report forwarded with this dispatch commenced as follows:—

"The Special Committee on Statistics have recently had under consideration the practicability of procuring reliable returns of the agricultural productions of India. The absence of accurate returns on this subject appears to them remarkable, seeing how large a portion of the Government income depends on the land revenue. It is, however, in most instances due, not so much to the want of suitable machinery for the collection of materials, as to deficient organization in dealing with them. It is, therefore, to the means of producing improvements in the latter

" respect that the committee have specially turned their attention "

After briefly recapitulating the forms laid down in 1866, to be adopted by all provincial Governments in their annual reports, the degree to which they had been adopted, and the difficulties raised in the matter, the fresh impulse given and fresh forms prescribed by the Public Works Department in 1869-70, in order to obtain information required for the working out of schemes of irrigation, the objections to those forms, the futility of some of those objections, and after pointing out what an admirable machinery exists in every province, except Bengal, for the collection of those statistics, only requiring a little organization to supervise and compile the results, the committee go on to say :—

" 22. We venture, then, to urge on your lordship the importance of the re-summption of measures for obtaining agricultural statistics from the various districts throughout India. The mistake, which appears to have been committed on the former occasion, of worrying the officers by calling for two sets of returns should be avoided; the village accountants or other officers should be required to prepare, from the information in their possession, returns giving particulars on cultivation on one uniform plan to be prescribed for them, not going into too minute detail, but calculated to enable the superior authorities to form accurate general conclusions respecting the condition of the district, and, where the village machinery is really not available, as in Bengal, the plan in operation in that province might be continued, of having a small staff specially appointed to collect the information in selected areas.

* * * * *

" 26 The chief points required appear to be:

- " Area under rabi and kharif crops, unirrigated, and irrigated, including bhagayat " or garden crops;
- " Area of fields under cultivation,
- " Amount of pasture and of forest land,
- " Extent of barren or waste unculturable land;
- " Total area assessed,
- " Total assessment;
- " Area under cultivation of the chief products of the district;
- " Amount of stock, specifying the number of the principal kinds of animals,
- " Average rates of wages for skilled and unskilled labour; and
- " Average rates of hire for live and dead stock.

" 29. These returns should be filled up with care, and duly criticised, so that any obvious errors may be at once detected; and then it may be hoped that before long the materials will exist for the compilation of a useful agricultural map of India, showing the area over which the main staples are chiefly cultivated, and that India will not be the only important part of the British Empire for which no information on the subject of agriculture can be laid before Parliament."

26 This dispatch, and the report enclosed, were forwarded on the 11th August 1875, to all local governments and administrations, with a request that the Government of India may be informed of the steps which the local authorities would propose to take. " The matter is," the Government of India said, " obviously one of great national importance, and his Excellency the Governor-General in Council, feels confident that it will receive the most careful and early consideration " of the local governments and administrations.

27. The Punjab Government's reply, dated 4th September 1876, was to the effect that it was no use to form a new central bureau for the purpose of collecting and reporting on agricultural statistics. What was wanted was not supervision at the top, but at the bottom of the scale, to ensure accuracy in the village returns.

The Financial Commissioner stated that there are 7,093 patwaris in the Punjab, and a kanungo over every 57 patwaris (in some 99 tahsils there is also a naib). What is wanted is a naib kanungo to every 10 patwaris, and this would cost Rs. 1,10,000; there would also be required some increase of establishments in the district and divisional offices for the purpose of compiling the village returns. The Lieutenant-Governor did not think the result would be worth the cost.

28. The reply of the North-Western Provinces Government does not appear.

29. The Chief Commissioner of Oudh held that it would be no use to create such an appointment as that of director of agricultural statistics, because the subordinate machinery was inefficient or altogether wanting. The patwaris were too incompetent to prepare the register and returns, and would have to be taught and trained before they could do this. A class of supervisors would have to be created, and the tahsildars relieved from their judicial work.

30. The Lieutenant-Governor of Bengal, Sir R. Temple, in a minute drawn up after reading Mr. MacDonnell's book on the Agricultural Condition of Behar and Northern Bengal, expressed his regret at the defective character of the statistics, but explained the cause of this deficiency to be the absence of a field survey. There was little hope of the Government undertaking so costly a measure as the cadastral survey of all Bengal, and in default he saw nothing better than to go on with Sir G. Campbell's plan of appointing special establishments to obtain accurate statistics in certain selected areas. The information thus obtained had been useful, and he asked permission to employ four special deputy collectors on this work in Bengal, and especially in Behar for a year. This was, however, refused by the Government of India.

31 The Chief Commissioner of Assam thought (17th February 1876) that for agricultural statistics and kindred objects, a department of agriculture and commerce should be established; but he pointed out that in some districts of the province there was no machinery at all corresponding to the patwaris, and in others what machinery there was was very imperfect and would have to be educated: besides which the intermediate establishments of supervisors would have to be created; and till this was done, there was no hope of making much progress in the desired direction.

32 In the Central Provinces the Chief Commissioner thought (27th December 1875) that the machinery for collecting agricultural statistics is inferior to the machinery in the North-Western Provinces. The patwaris in only a few districts are the servants of Government, in some districts they are the servants of the malguzars, and are paid what they can get from them. In the Nagpore Division there are no regular patwaris at all, the malguzar is only bound to submit certain annual papers, and can employ whom he likes in preparing them. The country is a poor one, and a cess which will support a patwari in the North-Western Provinces on a moderate area will only support him in the Central Provinces when drawn from a much larger area. Moreover, the supervising agency between the patwari and the kanungo is wanting, and the patwari is too constantly employed in judicial work. Mr. Morris, therefore, thought it useless to create a separate department, as in the North-Western Provinces, with a special officer at the top; but thought that much might be done by paying more attention to the training of patwaris and the testing of village returns, and promised that this should be done for the next few years.

33 The Chief Commissioner of Ajmere replied (11th May 1876) that the machinery for an accurate rendering of annual statistical returns was wanting, even in the khalsa lands, where, however, the settlement records give the facts accurately once for all. But " one-half " of the district is under isthmari tenure, in which " there has been no interior revenue survey." Thus the returns would only be fragmentary; but if it was considered worth while to endeavour to establish a system of annual report and registration of these statistics, Mr. Lyall was ready to institute some further inquiry as to ways and means.

34 The Government of Bombay stated (3rd December 1875) that in nearly the whole of the Presidency, except in Sindh, where there are no hereditary village accountants, there would be no difficulty in preparing annually the statistical returns desired, since, as a matter of fact, the annual forms now kept up are sufficient for the purpose. But those supply information only as to Government ryotwari lands, not for imam lands in Government villages, nor for alienated villages: and it would be difficult, if not impossible, to include these. Nothing was said as to measures for further ensuring the accuracy of these returns, and the Government concluded by saying that an appointment like that of the Director of Agriculture and Commerce in the North-Western Provinces, was not considered necessary for the present in Bombay.

35. The Commissioner of Berar said (dated 25th September 1875) that the required statistics could be

collected without any difficulty; and there would be no necessity for any additional establishment. The villages have all been surveyed, and over the patwaris there are these supervisors, or munserims, in each taluka, so with proper supervision by patwaris and assistant commissioners, the existing machinery is sufficient for the rendition of accurate returns.

23. The Chief Commissioner of Mysore replied that the annual returns already submitted contained all the required information; but that the figures would be accurate only in those parts of the province which have been surveyed field by field: in the rest only the old nominal areas can be given. He made no remarks on the subject of improving the existing machinery or of creating new.

37. The Madras Government replied in November 1875 that the subject "of collecting accurate information in respect to the agricultural statistics of India, had for some years engaged attention in this Presidency, where statements showing the average of crops, &c., are yearly prepared in each district and submitted to Government through the Board of Revenue." The Board of Revenue pointed out that their return related only to Government villages, and in order to extend the system to zemindaris, it would be necessary to take legislative power to bring the curnams in those estates under the collector's authority. The existing staff of inspectors would have to be largely increased, and a special officer appointed at the head of the department to tabulate and supervise the work: the whole would cost Rs. 2,50,000. On this (May 1876) the Madras Government said, "If the minute details, which the special committee (in the India Office) suggest should be appended to the returns, have to be furnished, an expensive establishment on the scale proposed by the Board of Revenue will have to be entertained; but if these details are not considered

"necessary, the returns now prepared in this Presidency, and which embody nearly all the information required by the forms prescribed by the committee, can be rendered more complete without additional expense."

38. The Chief Commissioner of British Burma replied (25th March 1876) that nearly all the information required was already given in the annual returns. The existing machinery consisted of the Thoogyees, or land tax collectors, who exercise jurisdiction over a circle of villages, regularly visit each of these villages, and are brought into contact almost individually with each member of the village community; and in this way it secures the collection of the necessary materials, and in most cases a proper record of results. Of course the statistics cannot be made strictly accurate till a field survey is made; but on the whole, Mr. Thompson thought they were fairly trustworthy, and if the Government of India would prescribe the exact forms, he would see that proper attention was paid to the subject.

39. The Public Works Department, with reference to the Secretary of State's dispatch, also wrote to the Department of Revenue, Agriculture and Commerce, on the subject of the collection of agricultural statistics. It reviewed briefly what it had done since 1868 in view to the collection of such statistics; it considered them of great importance as being the chief means by which the profits on the extensive outlay contemplated from loan funds on irrigation works could, with any degree of trustworthiness, be calculated; it considered them very necessary in view to calculating probable results in undertaking not only agricultural works but also those of transport; and it promised the issue of instructions to all officers under it to afford what aid they could in the collection and observation of facts bearing on these objects.

APPENDIX.
PART I.—DISTRIBUTION OF AREA IN ACRES.

Class.	Punjab.	Oudh.	Bengal.	Almere.	Central Pro- vinces. Hectares.	Bombay (excluding Shiu).	Penar.	Mysore.	Madras.	British Burmah.
	1873.	1873.	1872-73.	1873.	1873-74.	1873.	1873.	1873-74.	1873.	1873.
Food crops -	17,752,103	7,723,075	47,182,273	403,075	5,852,311	10,489,780	3,540,006	4,900,067	20,953,000	2,227,061
Non-food crops -	1,972,437	608,954	7,508,729	156,236	606,545	8,537,536	2,220,605	1,186,784	3,403,000	49,316
Groves -	58,378	—	—	—	—	—	4,485	—	234,000	110,672
Total cultivated area - . .	19,782,918	8,332,029	54,691,002	559,311	6,458,856	19,527,316	5,765,186	6,086,851	*22,364,000	2,396,949
Culturable fallow -	4,961,352	3,395,933	17,165,840	456,651	123,076	1,255,326	2,354,912	5,742,556	4,996,000	13,168
Unculturable waste -	28,341,596	2,931,647	22,844,633	692,066	7,556,858	1,830,333	1,285,889	1,818,161	61,163,520	49,662,843
Forest -	7,073,012	449,280	—	54,746	9,671,610	—	1,095,927	3,634,992	—	4,480,000
Total area -	60,153,878	15,108,889	94,731,475	1,762,774	23,810,400	22,702,040	10,501,914	17,282,560	88,523,520	56,552,960

* Deducting 2,226,000 acres twice cropped.

PART II.—PRODUCTION OF CROPS.

	PUNJAB.			ORISSA.		BENGAL.			ALMERE.			CENTRAL PROVINCES.			BOMBAY (BE- CLUDING SIND).			BIHAR.			MYSORE.			MADRAS.			BRITISH BURMA.		
	Area.	Seed.	Outturn.	Area.	Seed.	Outturn.	Area.	Seed.	Outturn.	Area.	Seed.	Outturn.	Area.	Seed.	Outturn.	Area.	Seed.	Outturn.	Area.	Seed.	Outturn.	Area.	Seed.	Outturn.	Area.	Seed.	Outturn.		
Wheat	5,820,801	1 1 11 10 30 1	1,839,503	747	1,405,471	30	1,150	4,083	100 500	1,573,552	183 1,100	1,228,005	454,505	0 17 3 0	16,080	653	20,000	—	—	—	—	—	—	—	—	—	—	—	
Barley	1,754,020	0 35 10 12 28 9	—	—	610,173	40	1,300	39,532	110 800	—	—	31,712	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
Mauze	986,041	0 15 9 7 10 8	—	—	893,901	—	850	24,050	25 500	—	—	20,012	280	0 1 1 5	—	—	—	—	—	—	—	—	—	—	—	—	—		
Jowar	2,025,522	0 9 3 7 16 11	—	—	—	—	—	—	—	—	—	1,559,320	3,846,467	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
Rajra	2,490,078	0 3 7 5 32 8	—	—	—	—	—	—	—	—	—	3,846,467	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
Rice	734,957	0 32 5 10 14 11	1,421,026	703	27,087,006	112	1,400	437	20 800	2,641,943	228 1,600	1,309,023	51,460	0 10 3 0	402,972	120	2,700,000	—	—	—	—	—	—	—	—	—	—		
Small millets	200,254	0 9 11 5 20 0	—	—	—	—	—	—	—	—	—	4,176	2,446,001	0 10 7 0	—	—	—	—	—	—	—	—	—	—	—	—	—		
Gram	1,803,001	0 20 4 3 9 13	—	—	—	—	—	—	—	—	—	357,998	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
Other pulses	2,210,524	0 13 8 4 28 11	—	—	—	—	—	—	—	—	—	37,705	503,372	0 9 31 0	4,045,355	638	2,211,000	—	—	—	—	—	—	—	—	—	—		
Spices	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
Other food grains	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
Market garden vege- tables	106,153	—	81,943	—	791,386	1,200	0,200	918	—	25,700	—	109,323	77,268	Rs 20	1,05,918	—	304,000	—	—	—	—	—	—	—	—	—	—		
Oil seeds	722,643	0 5 5 4 12 6	208,491	266	1,974,284	118 02	700	18,755	5 100	380,680	170 680	230,660	305,624	0 4 0 0	218,115	21	1,257,000	—	—	—	—	—	—	—	—	—	—		
Hemp	41,203	—	18,491	382	830,136	22 6	1,500	—	—	—	—	31,177	—	—	—	—	20,000	—	—	—	—	—	—	—	—	—	—		
Cotton	624,459	—	35,700	85	335,200	22 6	200	8,219	50 320	312,725	70 175	1,036,111	1,765,912	0 9 1 35	44,562	—	1,404,000	—	—	—	—	—	—	—	—	—	—		
Tea	9,805	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
Coffee	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
Sugarcane	374,125	—	227,896	765	1,011,969	—	9,600	365	—	42,505	—	56,933	—	—	—	—	36,000	—	—	—	—	—	—	—	—	—	—		
Tobacco	74,420	—	53,614	688	197,076	—	1,000	128	—	22,159	45 350	68,121	22,122	0 2 4 0	23,629	404	101,000	—	—	—	—	—	—	—	—	—	—		
Indigo	80,859	0 10 5 0 19 14	10,581	42	1,279,852	30 12	—	—	—	—	—	7,341	—	—	—	—	200,000	—	—	—	—	—	—	—	—	—	—		
Opium	12,408	—	54,181	12	461,807	11 15 10 20	12	28,49	4 13	—	—	238	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
Other dyes	23,246	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
Various non-food crops not specified	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
TOTAL	19,734,540	—	8,332,029	—	33,290,626	—	—	175,026	—	6,619,450	—	19,527,516	5,700,671	—	5,110,316	—	24,356,000	—	—	—	—	—	—	—	—	—	—		

A.—Average for 2,012,688 acres only; the balance being under root and other crops and seed for it not being started.
 B.—Value of the crop per acre—Rs 21-4-10 (estimate for 1873-4).
 C.—This includes all fibres except cotton.
 D.—Under potatoes.
 E.—Includes all fibres except cotton.
 F.—Cinchona included.

SECTION II.

SHOWING WHAT STATISTICS EXIST IN 1879.

The next point is to shew what improvement has been effected in the system of collecting agricultural statistics up to date: what information can be gathered from them in their present state, distinguishing, as far

as possible, the trustworthy from the conjectural figures: and what reform and enlargement the statistical system requires in order to reach the degree of perfection which may reasonably be aimed at.

THE PUNJAB.

Crop areas.

1. The system under which the agricultural returns of the Punjab are prepared is thus described by Major Wace. All the districts of the Punjab (except a portion of Kohat) have come under regular settlement, in the course of which every field has been surveyed and a record prepared, village by village, shewing the area of the field and the name of its occupant and owner. Every village (or if they are small, every group of villages) has its hereditary accountant or patwari, whose business it is, during the month of October in each year, to inspect every field, noting the crops grown upon it and the mutations of occupancy and ownership.

From these inspections statements are prepared annually, shewing the entire crop areas for each tahsil, for each district, and for the whole Province. It is not, however, stated what amount of supervision is exercised over the execution by the patwari of his duty. All that is said is that "there is no reason to suppose that in the majority of instances the patwaris' reports contain any very gross errors of area and classifications," and that great improvement has taken place during the past 15 years in the returns of the 21 districts which have come most recently under settlement.

Average outturn.

2. The estimated yield of each crop is also reported annually from each district, but these statistics are professedly conjectural.

"The difficulties surrounding this question, even in advanced European country, are very great, and in India they are exaggerated manifold. The agriculturists keep no record of what their crops produce, and the replies of even the most intelligent and straightforward among them need to be very carefully weighed. The Financial Commissioner has found the returns of yield of each crop reported from year to year by each district officer are not usually in strict language estimates of the yield for the year under report; they are approximations arrived at by the reporting officer by the use of the data of old experiments. The experiments are either those made when the district was under settlement, or others made independently by orders of the Financial Commissioner during the years 1872-1875. As regards the settlement experiments, Mr. Ouseley observes that their value for the purpose to which they are applied are open to question. The officers who made them commonly mistrust the results; in practice they never assess up to the standard indicated by their produce estimates, and not uncommonly arbitrarily modify or frankly reject them. Also the small areas, usually small fractions of an acre, subjected to actual experiment, together with the limited periods over which the observations extend, greatly reduce their value as bases for generalisation concerning the value of the other set of experiments, those made by order of the Financial Commissioner during the years 1872-1875. Mr. Ouseley directs me to quote the remarks on the subject made by his predecessor in forwarding them to Government for submission to the International Statistical Congress. "As the experiments, the results of which have now been embodied, extend over a considerable period and number several thousands, the results may be considered to be fairly general in their nature. With regard to their accuracy, it is necessary to remark that the facilities for supervision of such returns are limited, and that only of late have attempts been made to procure such statistics upon an extensive scale, and the subject is one which requires considerable experience on the part of those who make the observations, and a careful exclusion of all unreliable data, to an extent which the returns now furnished can hardly claim. "The last sentence expresses one of the greatest

"difficulties involved in the subject. And Mr. Ouseley considers that the improvement of our annual estimates of yield depends largely on our recognising this, and on the patient training of those on whom we depend for our observations."

Improvements suggested.

3. Several improvements are suggested by the late Financial Commissioner in the mode of preparing these statistics. As to outturn it ought to be possible to observe for many successive years the actual outturn of say 500 acres of average land, noting the variations of season, and their effects, the unforeseen accidents and losses suffered by the crops, &c. "With the large revenue establishment at the disposal of Government, such observations would be practicable."

As to the crop areas, the patwari's inspection in October enables him to record the fields sown with rabi, but not the fields harvested. Many are cut green for fodder, and in many the seed fails to germinate or the crop is destroyed by some calamity. His visits ought then to take place twice a year, at the end of each harvest. Again, more pains should be taken to suit forms which have to be filled up to the special character of the district where they are used, and they should show (which they do not now) what fields are manured or irrigated. In order to effect these improvements, Mr. Ouseley recommended an increase in special agency and cost of supervision, and the creation of an appointment similar to that held by Mr. Buck in the North-Western Provinces.

"If the attention which Government desire its district officers to give to agriculture and its statistics is to be intelligently directed and to achieve any results, this can only be by providing at least one officer in each province, who can give his sole attention to the supervision of the subject."

4. The following is the information which under the system described the Punjab Government has been able to provide at the request of the Famine Commission.

(1) *Population*.—This is accurately known from the census of 1868, when it was 17,604,505 souls, but no attempt has been made to calculate the increase since that year.

(2) *Crop areas*.—The average area under each kind of crop for the last five years is given for each district, and may probably be looked on as fairly accurate so far as the area alone is concerned. But no attempt has been made to take note of the twice-cropped land, without a knowledge of which and of the crop it bears no statement is complete; and no record appears to be kept of the crops specially grown as fodder, though it is known that in the drier parts of the Punjab a large area is cultivated in this way. Presumably a considerable deduction ought to be made on this account from the area shown as under food-grains. The area under cultivation is stated to be 21 millions of acres, of which 18½ millions, or 88 per cent., are under food-crops. There are therefore 1·25 cultivated acres, and 1·05 acres under food-crops, to each person in the Province.

(3) *Average outturn*.—Here we have—(1) the annual estimate made by each district officer for each main crop during the last five years; (2) the estimate of the Financial Commissioner made under the circumstances described in paragraph 2; (3) the estimate of average produce made by several of the most experienced Settlement Officers; (4) the statistics collected by Mr. Baden-Powell in his work on Punjab products; (5) estimates of the outturn on irrigated lands compiled by Canal Officers. All these have been consulted and combined in order to arrive at one general estimate of the average produce of an average year. That quantity is 322 seers, or 644 lbs., or about 11 bushels per acre. The following are the areas under the main crops, and the estimated quantity (in seers

per acre) of seed-grain and of average outturn in the case of the food-crops :—

	Acres.	Seed-grain.	Outturn.
Wheat	6,354,266	42	400
Barley	1,685,025	35	400
Rice	728,259	32	400
Jowar and bajra.	5,129,248	5	250
Maize	921,968	14	300
Small millets	163,280	10	200
Pulses, gram	1,650,727	20	300
Do. others	1,887,073	8	200
Total food-crops	18,519,846	23·6	322

(4) *The ordinary rate of consumption of food by the people.*—No statistics on this subject exist. District officers were called on to enquire and report what is the daily amount of food consumed, and their calculations work out to an average of '884 of a seer for agriculturists, and '687 of a seer for non-agriculturists, or '773 (which amounts to 24½oz.) for the whole population. Some of the estimates, however, were unreasonably large, and the Financial Commissioner decided on assuming an average rate of 20oz., or '625 of a-seer per head per diem, or 5·7 maunds, or 456lbs., per annum. No reference is here made to what should be one of the best guides to a conclusion on this point, the amount found necessary to support life in jails. Mr. Thornton states this as nearly 1½lbs. of flour for an adult male, besides pulses; and this, making due deductions for women and children, work out to 1 lb. 3 oz. of flour a head. This, with the minimum allowance of pulse, 2oz., added, comes to 465 lbs. per head per annum. No allowance has here been made for loss in grinding, which would probably raise the consumption to about 480 lbs., or 6 maunds, of dry grain per annum.

(5) *The amount required for seed grain.*—This is known with tolerable accuracy, and averages to 23·6 seers per acre.

(6) *The amount lost by wastage.*—This has been assumed as 5 per cent. of the produce.

(7) *The consumption of the Military and of European residents in their private capacity.*—The former is known to be 700,000 maunds; the latter has been guessed to amount to 300,000 maunds.

(8) *The consumption of cattle owned by Natives.*—Hardly any facts are known bearing on this subject. The total figure is guessed at, being put at 6 million maunds. This is nearly one maund per annum for each of the horned cattle (bullocks, cows, and buffaloes) shown in the agricultural returns, or a little less than ½ of a maund per cultivated acre.

(9) *The average exports.*—An establishment is kept up at the principal thoroughfares leading into and out of the province, to record the movements of all articles of

commerce. Their returns are published yearly, and the figures for five years, with the averages, are contained in the provincial reply. The traffic is carried on by (1) Native land carriage; (2) Native boats on the Indus; (3) the Indus Steam Flotilla; (4) the Railways. Of these, the last two give statistics which are quite trustworthy; the two former can be less relied on.

5. The following is a summary of the figures returned under these different heads :—

Population	-	17,604,500 souls.
Cultivated area	-	21,100,000 acres.
Area under food crops	-	18,520,000 acres.
Average outturn per acre	-	644lbs., or 322 seers, or 8½ maunds (or about 11 bushels).
Total outturn of food	-	149,280,277 maunds, or 5,331,500 tons (say 5,300,000) (at 28 maunds to the ton).
Food consumed by the people	-	100,400,693 maunds, or 3,586,000 tons.
Seed-grain	-	10,936,426 " or 390,000 "
Wastage	-	7,464,014 " or 266,400 "
Consumption of animals belonging to the Commissariat	-	1,000,000 " or 35,700 "
Ditto by Native cattle	-	6,000,000 " or 214,000 "
Average exports	-	4,516,490 " or 161,000 "
Total accounted for	-	130,317,600 " or 4,652,000 "
Surplus	-	18,962,600 " or 679,000 "

That the unaccounted-for surplus should be so large shews some error in the calculation.

It may be, as the Financial Commissioner thought, that the average produce is overrated, or it may be that the average consumption is put too low; if the rate was raised, as above suggested, to 6 maunds per head, the consumption would be 105,627,000 maunds instead of 100,400,693 maunds, and this would dispose of nearly 200,000 tons of the surplus.

Again, Mr. Thornton has suggested that the seventeen and a half millions of 1868 have now increased to 20 millions, and this alone entailing an addition of ¼th to the food consumed, or 784,000 tons, would turn the surplus into a deficit.

It is probable, therefore, that the explanation of the discrepancy lies in one or more of four sources of error; the outturn of the crop is underrated, as no allowance is made for twice cropping; the area of food-crops is exaggerated, no part having been struck out for green fodder; the average daily consumption is perhaps a little underrated, and the real average return of food-crops may be also a little below the estimate, or even a little above it.

6. With regard to non-food crops, Mr. Thornton has contributed a valuable paper estimating the quantity produced and the ordinary consumption per head of each kind of article. The information contained in that paper, with some modifications based on the official returns of area, &c., may be summarised thus :—

Article.	Area in acres.	Rate of production per acre.	Outturn in maunds.	Value in rupees.	Rate of consumption per head.	Quantity consumed in maunds by the agricultural population, taken at 11 millions.	Surplus in maunds.	Value in Rs.
Sugarcane	350	1,600 lbs.	7,000	1,75,00	30 lbs.	4,125	2,875	71,87
Cotton	800	100	1,000	1,27,00	4	550	450	56,25
Vegetables	250	6,000	18,750	10,00	66	9,075	9,675	51,60
Spices	200	500	1,250	80,00	4½	584	666	42,62
Tobacco	74	1,000	925	20,00	4	550	375	8,11
Indigo, opium, and miscellaneous	126	20 Rs.	—	25,20	—	—	—	25,20
Oil-seeds	800	500 lbs.	5,000	18,75	32	4,400	600	2,25
Ghi and milk	—	—	—	4,00,00	2 Rs.	—	—	1,80,00
Wool	—	—	—	80,00	1½ lbs.	165	—	63,50
Leather	—	—	—	60,00	—	—	—	40,00
Meat	—	—	—	2,50,00	15 lbs.	2,062	—	1,12,50
Timber	—	—	—	1,00,00	—	—	—	1,00,00
Fuel	—	—	—	2,30,00	—	—	—	2,30,00
TOTAL	—	—	—	15,46,00	—	—	—	9,63,90

* Three 0's omitted.

According to this estimate, the agricultural population, after fully supplying themselves with all requisites, raise from their non-food crops and the miscellaneous products of the country a surplus income of Rs. 9,89,90,000. Their food-crops produce, as has been seen, 5,300,000 tons; and after deducting their share of the consumption, wastage, and cattle-food and all the seed-grain, there remains a surplus of 58,880,000 maunds, or 2,100,000 tons, which they sell to townspeople and traders for Rs. 105,00,00,000 making a total surplus of Rs. 20,33,90,000. Out of this they have to pay land tax and cesses Rs. 2,40,00,000, or 11·8 per cent. of their surplus, the balance of which, or Rs. 17,93,00,000, remains to meet the cost of the few things they need to buy, such as salt, and the luxuries, such as English cloth, refined sugar, &c., which they usually indulge in. The surplus thus calculated amounts to Rs. 16 per head, or about Rs. 80 per family. The agricultural population are however, here taken as only eleven out of twenty millions, and it may be disputed whether their number has not in this estimate been put too low.

7. A further class of statistics relate to irrigation, on which subject the following information is given. The 21 millions of cultivated land are thus distributed:—

	Millions of acres.		
	Irrigated.	Unirrigated.	Total.
Food-grains - - - - -	4½	14	18½
Non-food grains - - - - -	1	1½	2½
Total - - - - -	5½	15½	21

The irrigated area is classified thus:—

Source of Irrigation	Acres.	Per cent.
Wells - - - - -	3,176,074	55
Perennial canals - - - - -	739,645	14
Inundation - - - - -	933,944	18
Tanks and ponds - - - - -	143,236	2
Small channels and streams - - - - -	642,887	11
	5,635,786	—

The unirrigated area under food-grains is thus classified:—

Sailab, or usually moistened by river-flooding or percolation - - - - -	1½ millions of acres.
Moderately safe, as grown under a rainfall which is abundant in ordinary years - - - - -	6½ „ „
Dependent on a very precarious rainfall * - - - - -	6 „ „
Total - - - - -	14 „ „

It is estimated further that the average produce of an irrigated acre is to that of an unirrigated acre as about 3 to 2, and that a further deduction should be made to arrive at the average produce of the dry lands dependent on a precarious rainfall. On this hypothesis the amount of food produced on the different classes of cultivated land will be as follows:—

	Cultivated area. Millions of acres.	Proportionate rate of yield.	Maunds per acre.	Total yield in millions of maunds.	Percentage of total yield.
Irrigated - - - - -	4½	4·5	12	54	36
Aided by floods or by usually abundant rainfall - - - - -	8	3	8	64	43
Cultivated under precarious rainfall - - - - -	6	2	5·2	31	21
TOTAL - - - - -	18½	—	8·05	149	100

8. The third class of information which the Punjab agricultural statistics give with much fullness, is that relating to the tenures of land, both as regards ownership and as regards occupancy. The following are the statistics of ownership:—

Nature of tenure.	Number of persons.	Total area. Acres.	Average area per head.	Percentage of area under each class of tenure.
Grantees and lessees - - - - -	23,351	1,772,000	76	3
Landholders who have redeemed the revenue - - - - -	595	51,000	85	1
Great zemindars not cultivating personally - - - - -	3,389	2,690,000	798	5
Proprietary cultivating bodies - - - - -	2,417,473	48,278,000	20	92

But though the vast majority of the land is owned by cultivating proprietary bodies, this does not imply that they cultivate the whole of the land they own. On the contrary, the area actually cultivated by tenants is 10,108,000 acres, or 44 per cent. of the whole 21 millions; but a portion of this is tilled by persons who

are owners of their own land, and also cultivate the lands of other; and making allowance for this, it is estimated that about 60 per cent. of the land is cultivated by persons who are proprietors by class, and about 40 per cent. by the tenants who hold under them. The main classes are as follows:—

Nature of tenure.	Number of persons.	Area in acres.	Average area per holding.
Cultivators with occupancy rights - - - - -	512,070	3,382,596	A. R. P.
„ holding conditionally for life or on lease - - - - -	28,417	158,244	6 2 17
Tenants-at-will - - - - -	1,096,590	6,488,313	5 2 11
Tenants on service grants - - - - -	40,409	79,590	5 3 26
	1,677,486	10,108,745	1 3 35
			6 0 4

* That is, all the Hissar Division (three million acres) and portions of the Delhi, Umballa, Lahore, Rawalpindi and Umballa Divisions.

The returns shew further that of the occupancy tenants, in two-thirds of the area the rent is paid in cash, on the rest it is paid in a share, varying from a half to a fifth of the produce. Of the area held by tenants-at-will in 43 per cent. cash rents are paid, in 27 per cent the rent is half the produce, and in 30 per cent. it is less than half.

9. These statistics (of which only an abstract is given here) leave hardly anything to be desired; but they contain one element of error, in that they cannot be

trusted to shew the exact number of agricultural persons, the same name occurring twice or oftener where the same person owns two or more distinct holdings or shares in holdings. This re-duplication occurs more frequently in the case of owners than of tenants. But reckoning that one family (whether of tenants or proprietors) can till 6 acres, the cultivated area, 21 millions of acres, will employ $3\frac{1}{2}$ million families, or at least 14 millions of people, at four to a family

NORTH-WESTERN PROVINCES AND OUDH.

1. In the North-Western Provinces and Oudh the system under which the patwari sends in the annual accounts of his village corresponds closely to that existing in the Punjab, and need not be described again. But in the North-Western Provinces there has been established a body of supervising officers (kanungos) for the purpose of testing and inspecting these village records, and of securing accuracy and punctuality in submission, and of totalling them up and summarising them for each of the territorial subdivisions. This establishment (which has not yet been introduced into Oudh) is under the Department of Agriculture and Commerce, which was created in 1875; and when the whole system has been got into proper working, the completeness and truthfulness of the village records will leave little to desire. But there have been many difficulties to contend against. The basis of all these returns is the field survey, under which an accurate and complete record is prepared once for all for each village, and if the subject is then immediately taken in hand as soon as the survey is finished, and every change in the area of fields, in crop, irrigation, tenures, &c., is recorded year by year, a faithful representation of the condition of the village will always be at hand. But the tendency of the village accountants, if not carefully looked after, is to avoid the trouble of recording changes, and to make the same entries year after year, and in the course of a little time the returns become so inaccurate that it is not an easy matter to set them right. When Mr. Buck's Department was created, the survey and settlement of some districts was still going on, or had only just been completed, and in these cases it was easy to start the new system, but in some districts the field survey had been made as long as 10 or 15 years before, and there it will take some time to secure accuracy. Again, there are in the North-Western Provinces four districts and a portion of a fifth, in which the settlement was made permanent in 1795; in these there has been no fresh field survey, and the village returns have been so incorrect as to be altogether valueless. A cadastral survey, however, is now going on, and when that is accomplished, the information will be as full for these as for any other part of the North-Western Provinces. Lastly, there are the twelve districts of Oudh in which the settlement has recently been made, but no special steps have been taken to provide for the correctness of the annual returns. A further difficulty also supervened, arising

from the drought of 1877, which checked the progress of the work of this department because its officers, the kanungos, had to be diverted from their proper work in order to be utilised in the more pressing duties of Famine Relief. The returns of that year would, however, have been of very little value, as the cultivation and crops were most abnormal.

2. Thus there are at present four classes of districts to be dealt with—

- (1) 24 districts surveyed and settled within recent years, and in which Mr. Buck's system has been completely introduced
- (2) 6 districts (3 of them in the Himalayas) in which the system has not been properly introduced as yet.
- (3) 5 districts permanently settled, the returns of which are of very little value.
- (4) 12 districts of Oudh, the accounts of which are fairly good but not quite trustworthy in all details.

3. The information regarding the first class of districts is fairly complete, and the method adopted in the provincial reply by Messrs Elliott and Buck has been to work out the crop areas for them, and then, the cultivated area of the other districts being known, to assume that the different crops are sown in the whole Province over the same proportionate area as that which they occupy in the 24 districts. This method appears to be the best that can be adopted now, but it is evidently only provisional and tentative, and will be superseded when the agricultural department has got the patwaris into a better state of discipline.

4. With regard to average outturn per acre, the estimates made by the different settlement officers have been examined and compared with each other, and with records of actual experiments, and have been tested by the principle that such a result must be brought out as shall shew that the province as a whole feeds itself and produces a slight surplus for export; the same principle too is applied to each district, excepting only those which have a large urban and non-agricultural population. But as the southern districts of Oudh and the Benares Division have a denser population and are more highly cultivated than the average of the 24 districts which include the poor soil of Bundelkhand, it has been found necessary slightly to raise the average outturn per acre, and to assume a larger extent of double-cropping.

Food crops.	Area in acres.	Rate per acre.	Total outturn in maunds.	Non-food crops	Area in acres.	Rate per acre.	Total value in rupees.
	*		*		*	Rupees.	†
Wheat - - - -	6,019·7	11·01	66,276·9	Sugar-cane - - -	820·5	80	65,640
Barley - - - -	1,799·2	10·18	18,315·8	Cotton - - - -	783·9	20	15,678
Gram - - - -	2,451·9	8·37	20,522·4	Cotton and Arhar -	1,387·6	10	13,876
Peas - - - -	198·3	5·97	1,183·8	Fibres - - - -	108·9	20	2,198
Wheat, mixed - -	3,669·2	9·35	34,307	Indigo - - - -	331·2	20	6,624
Barley, mixed - -	2,918·9	9·57	27,983·8	Fodder - - - -	670	20	13,400
Jowar - - - -	4,976·5	7·29	36,278·6	Potatoes - - - -	25·7	100	2,570
Bajra - - - -	3,364	6·85	21,361·4	Garden Crops - -	807	30	9,210
Rice - - - -	2,505·4	11·19	28,035·4	Tobacco - - - -	55·9	50	2,795
Maize - - - -	846	11·33	9,585·2	Opium - - - -	115·6	50	5,780
Pulses - - - -	1,251	7·00	8,757	Oilseeds - - - -	534·7	20	10,694
Small Millets - -	819	7·00	5,733	Miscellaneous - -	91	20	1,820
Others - - - -	113·9	7·00	797·3				
Arhar, mixed - -	—	5·00	6,938				
Total - - -	30,933	9·22	286,302·6	Total - - -	5,233	28·7	1,50,285
Add for double cropping and for higher rate of production in Oudh and East Districts -	517	—	28,197·4				
Total - - -	31,450	10	314,500				

* Three 0's omitted.

5. With regard to consumption, the estimates (which are fully explained and justified in the provincial reply) are as follows:—

	Maunds.
Human food, at $5\frac{3}{4}$ maunds per annum for 41 millions	235,750,000
Seed-grain (about 30 scers per acre)	22,994,000
Wastage, at 5 per cent. on outturn	15,725,000
Cattle-food, at $\frac{1}{4}$ maund per acre	23,232,000
Total	297,701,000

leaving a surplus of 17 million maunds, or 650,000 tons, (or $\frac{5}{8}$ of the produce) to cover the usual export and the

ordinary losses of the season, in which some crop is sure always to fall below an average.

6. Reckoning the classes engaged in agriculture, either as land-owners, tenants, or labourers, at 33 millions out of the 41 millions of inhabitants of the province, or 80·5 per cent. (a much higher proportion than that which was assumed in the Punjab, but one for which reasons are assigned in the provincial reply), the following estimate has been framed, to shew the condition of the agricultural population, the gross amount and value of the produce raised by them, the portion of it which they retain to supply their own necessities, and the amount and value of the surplus which they sell to traders and to towns-people.

Article.	Maunds.	Rate.	Value.	Rate of Consumption per head.	Consumption of 33 million.	Surplus.	Value of surplus.
	*		Rs		Maunds.	Maunds.	Rs.
Food-grains	314,500	50 per ton	56,16,00	$5\frac{1}{4}$ maunds, plus seed grain, cattle food, and wastage.	245,463	69,073	12,32,50
Sugarcane	24,600	3 per md	7,38,00	30 lbs.	12,375	12,225	3,66,75
Cotton	2,215	10 "	2,21,50	4 "	1,650	565	56,50
Tobacco	2,050	2·8 "	51,25	4 "	1,650	400	10,00
Vegetables	30,750	1 "	3,07,50	60 "	24,750	6,000	60,00
Spices	2,177	6 "	1,30,62	$4\frac{1}{4}$ "	1,753	424	25,44
Oilseed	19,800	2·8 "	4,95,00	32 "	13,200	6,600	1,55,00
Ghi	2,250	20 "	4,50,00	$4\frac{1}{4}$ "	1,753	497	99,40
Milk	7,687	2 "	1,58,74	15 "	6,187	1,500	30,00
Fibres	220	8 "	17,60	—	—	200	17,60
Opium	—	50 per acre	57,80	—	—	—	57,80
Indigo	—	20 "	66,24	—	—	—	66,24
Total	—	—	83,05,25	—	—	—	21,77,23

* Three 0's omitted.

7. From this it appears that the land revenue, Rs. 5,66,75,000 is about a fifteenth part, or 6·8 per cent. of the value of the gross produce, while the land revenue including local and other cesses amounts to Rs. 6,51,76,000, and is 33 per cent. of the value of the surplus produce, which the agriculturists dispose of after supplying their own requirements. Each agricultural family has then a surplus income of about Rs. 20 a year. This it will be observed does not include some of the items entered in the Punjab estimate, the value of produce from wool, leather, meat, timber, and fuel, items which are undoubtedly real, though the compilers of this estimate found themselves unable to name any precise figures as representing their value; nor does it include income which may be earned in other ways than agriculture, such as by weaving, by handicrafts, and by following other trades which many persons combine with the cultivation of land.

8. With regard to irrigation, Mr. Buck's department has supplied very complete statistics to shew the actual area irrigated in 1876-77. There are three classes of irrigation, by canals, by wells, and by lifting water from streams and ponds, and the figures in the table opposite shew the extent to which each source of supply was utilised in 1876-77.

Source of Irrigation.	Acres.	Per centage on total Cultivation.
Canals	1,148,000	3·4
Wells	5,794,000	17·2
Streams and ponds	3,967,000	11·8
Total	10,909,000	32·4

Of these three sources the last one is very precarious; the small streams and ponds of the country being liable to dry up if the rains are deficient. Canal irrigation on the other hand has increased and is increasing: in 1877-78 it supplied water to 1,412,460 acres, and in 1878-79 it reached the unparalleled extent of 1,694,000 acres. This increases the total irrigated area to 12,123,000 acres.

9 The irrigation is however unequally distributed, and the following table has been drawn up to shew in what proportions each of the main divisions of the province are supplied with water, what amount of food-grain could be raised in a famine year by the help of that water, and what would be the minimum quantity on which the inhabitants could live, supposing that they reduced their requirements to a minimum subsistence rate of 1 lb. per day.

Name of Tract.	Total Cultivated Area.	Total Irrigated Area.	Per centage of Cultivated to Irrigated.	Irrigation by Wells and Canals only.	Per centage of Irrigated to Cultivated.	Population.	Minimum Food required by Population.	Irrigated Area required to produce that Supply.
	Acres.	Acres.		Acres.			Mds.	Acres
Doab	9,218,000	4,036,000	43·8	3,724,000	40·4	11,011,000	49,550,000	4,130,000
Rohilkhand	4,420,000	871,000	19·7	597,000	13·5	5,436,000	24,460,000	2,040,000
Gadh	8,299,000	3,296,000	39·7	1,314,000	15·8	11,200,000	50,400,000	4,200,000
Eastern districts	7,541,000	2,925,000	38·8	1,597,000	21·2	9,671,000	43,520,000	3,630,000
Trans-Jumna	4,092,000	297,000	7·2	242,000	6	3,802,000	17,110,000	1,420,000
Total	33,570,000	11,425,000	33	7,474,000	22·6	41,120,000	185,040,000	15,420,000

* In these two columns 637,000 acres of increased canal irrigation are added, in excess of the figures in the preceding paragraph.

While 15½ million acres of irrigated land are required to produce enough food to supply the whole population in a year of drought, the province contains at present 7½ millions securely irrigated. Of the 4 million acres situated in depressions and valleys at least 2 would probably be moist enough to grow a rabi crop in such a year, and there must always, however calamitous the season turn out, be some rainfall and some produce from the kharif lands. Putting all these together, it is estimated that in the worst conceivable year enough food would be raised to supply the population with food for eight months, and for the remaining four months reliance must be placed on the local food stocks and the importing power of the railways.

10. The last item of agricultural information is very imperfectly given by the North-Western Provinces, that is, the statistics shewing the number of persons owning or occupying land on different tenures and the area thus divided among them. The information can of course be got from the village records, but it has not as yet been tabulated and compiled. The following statements shew how the area is held by the different classes of proprietors and of cultivators, but does not give their numbers :—

Classes of Proprietors.	North-Western Provinces.	Oudh
Talukdars - - -	3 per cent.	59
Undivided communities -	39 „	16
Divided „ -	51 „	20
Revenue-free estates -	4 „	2
Others - - -	3 „	3

Classes of Occupants.	North-Western Provinces.	Oudh
Cultivated by landowners -	26·5 per cent.	21 p.c.
„ tenants with occupancy or other rights -	41·7 „	1 „
„ tenants-at-will	31·8 „	77 „

11. The main points to which the attention of the Director of the Agricultural Department in the North-Western Provinces and Oudh should be especially directed, in order to complete the system of agricultural statistics, and to make it coherent and efficient, appear to be—(1) the extent of double-cropped land; (2) the degree to which the admixture of the subsidiary grains and undergrowth increases the food-supply of the people; (3) the amount of grain given as food to cattle; (4) the average rate of produce of all grains; (5) the rate of consumption of the supplementary articles of diet, such as sugar, tobacco, vegetables, and spices; (6) a more correct classification of the highly cultivated garden crops; (7) the amount of income derived from such articles of produce as wool, timber, and fuel, milk and ghi, leather and meat; (8) the extent to which persons combine the practice of trades or handicrafts with agriculture; (9) the enumeration of landholders and occupiers of land and classification of them under their respective holdings. The machinery exists by which all these ends may be attained, and if their importance is properly realized, there can be little doubt that in a short time a sound basis will be laid down for obtaining accurate knowledge of the condition and prospects of the agricultural population.

BENGAL.

1. In Bengal, agricultural statistics can hardly be said to exist. No field survey has ever been made for the Province, no annual returns of crops, tenures, &c., such as are kept up in all other Provinces of India, are maintained here, and no village agency exists in some parts of the Province through which they could be prepared. About 40 years ago, when the Orissa Province was settled for a term of 30 years, a rough field survey was made; but nothing has been done to keep up its records or to correct them in accordance with the changes that have taken place. Recently a cadastral survey under professional officers has been made of that part of the Shahabad district in which the Soane canal runs, but it has been made only for canal purposes, and it has not been linked in with the revenue system and records. Scattered surveys have also been made of a few estates held by Government or managed by the Court of Wards, but these are only rare exceptions, and on the whole it must be said that no certain knowledge exists as to the extent of the cultivated area, or the average of any crops. The Government has always shrunk from the expense and difficulty of a cadastral survey, but an effort was made for a few years to collect information by employing special officers to investigate small selected areas which might be used as exemplars from which to generalize. Whatever results this system may have achieved, the Bengal Government has not thought it worth while to place them before the Famine Commission, and the experiment has now been given up as a failure. The estimate made by the Bengal Government is that the Province with a population of 60 millions contains about 54½ millions cultivated acres, of which about 48½ are under food-crops, giving '91 cultivated acres and '81 food-

growing acres per head. In some parts, such as Hughli, the 24 Perganas, and Nadiya, there are less than half an acre of food-crops per head, a ratio which implies extraordinary fertility and high cultivation. But these statistics are too uncertain for us to draw any definite conclusion from them.

2. In 1874 a specially selected officer Mr. A. P. MacDonnell, was appointed to draw up a report on the food-supply of Behar and Bengal, but the want of any sure knowledge as to areas hampered all his calculations. The six districts of the Behar Division (excluding Patna) are those to which he devoted most of his time and strength, and his conclusion there is that the cultivated area is approximately 11,040,000 acres, supporting a population of 11,530,000 people, or about an acre per head; that the average outturn of food produced is about 11 maunds, or two-fifths of a ton per acre; the people required for food about a quarter of a ton per head per annum, and thus about one-seventh of a ton remains as annual surplus to cover seed-grain, wastage, cattle-food, and export. {Even this information, slight and conjectural as it is, must not be despised, for it would have saved the Government from some degree of error and incertitude in 1866, in 1873-74, and again in 1875, had they possessed the knowledge here conveyed as to the ratios of the three main crops to each other and the amount of loss that can happen to one of them without incurring a risk of famine. The information which Mr. MacDonnell's book contains regarding areas under the different classes of food-crops in some of the districts of the Province is embodied in the following table. Some of these figures are based on more complete and some on less complete data, but in no case are they altogether to be relied on :—

DISTRICTS.	Total Cultivated Area (in acres).	Total Food-crop Area (in acres).	AREA (IN ACRES) UNDER.		
			Bhadol.	White Rice.	Rabi.
Shanabad - - - - -	1,690,000	1,610,000	240,000	800,000	570,000
Saran - - - - -	2,320,000	2,042,000	820,706	419,952	801,419
Darbhanga - - - - -	2,049,009	1,964,009	506,884	951,418	505,984
Mozaffarpur - - - - -	1,816,000	1,712,000	464,055	762,830	484,707
Champaran - - - - -	1,437,000	1,308,000	408,584	577,511	322,201
Gya - - - - -	1,728,000	1,640,000	259,128	864,186	516,692
Bhagalpur - - - - -	2,835,961	2,326,890	712,700	1,153,100	188,000
Monghyr - - - - -	1,952,000	1,802,000	470,000	500,155	601,000
Purneah - - - - -	1,586,357	1,300,823	747,176	1,018,876	679,250
Dinaypur - - - - -	1,689,000	1,353,000	165,585	1,159,089	27,500
Rangpur - - - - -	1,934,000	1,644,000	315,800	1,222,500	84,352
Marshadabad - - - - -	989,000	881,000	9,744	760,068	110,981
Bogra - - - - -	964,040	848,423	3,700	565,700	54,700
Birbhum - - - - -	566,400	556,400	—	516,588	22,667
Bankura - - - - -	423,000	406,000	1,560	397,217	6,875
Bardwan - - - - -	2,009,680	1,894,680	—	1,155,000	66,000
Total of 16 districts - - -	25,989,447	23,279,225	5,125,622	12,824,190	5,042,328

3. Although it is not worth while in the existing defect of knowledge to attempt to make any definite estimate of the probable food-produce per acre for Bengal, it may be as well to indicate broadly the limits within which this estimate must lie. The population being 60 millions and the acreage of food-crops about 48½ millions, the consumption (at six maunds per head per annum, a slightly larger quantity being assumed because of the less nutritious quality of rice)—

	Maunds.
would be - - - - -	360,000,000
Seed-grain at 50 lbs per acre - - -	30,000,000
Wastage at 5 per cent. - - -	25,000,000
Cattle-food at half ind. per acre - -	27,000,000
	442,000,000
Add export of rice, average 500,000 tons - - - - -	16,800,000
Add an equal amount for surplus retained to meet deficient years, &c - - - - -	16,800,000
Total - - - - -	475,600,000
or say - - - - -	17,000,000 tons.

This quantity, if produced by 48½ million acres, gives an average produce of almost 10 maunds per acre. If, as is probable, the area is underestimated, the average produce must be less. This conclusion, vague as it is, shows that for the whole province it is impossible to assume a higher rate of production than at the outside 10 maunds per acre, although no doubt in the more densely-populated districts the outturn is considerably higher.

4 Irrigation in Bengal is of two descriptions. Hill streams are utilized and wells and tanks exist in Behar, the latter being formed by throwing low earthen banks across a depression to catch the surface water and divert it to rice-fields: in a year of drought they are quite useless. Wells are pretty common, especially in the southern part of Behar, and are estimated to irrigate about 600,000 acres, while the hill streams are credited with about 100,000 acres. In Bengal proper neither wells nor irrigation-tanks exist. There are three canals which at present irrigate 454,000 acres: when the distribution is complete it is expected that they will supply water in the very driest year to 1,330,000 acres, to which two other schemes now in hand will add an area of 170,000 acres. But this extension will supersede well-irrigation in 500,000 out of the 600,000 acres now watered by them. The total irrigated area therefore when all the present schemes are complete will amount to about 1,700,000, of 3 per cent of the total cultivated area. It is shown, however (in a note drawn up by Colonel Haig for the Famine

Commission), that the eastern part of Bengal is altogether free from any apprehension of drought; the portion west of a line drawn north and south through Calcutta is exposed to danger, and this tract contains about 35 million acres under food-crops; of this again the portion where the rainfall is most precarious, Orissa and North Behar, contains 9 million acres under food-crops. In this area the only irrigation would be the tract irrigated by the Orissa Canal and that protected by hill-streams, say about 280,000 acres.

5. The following information is given with regard to the tenures of land. They are divided into three classes. The first class consists of the landowners who hold estates direct from Government, the numbers of which are—

Estates with a rental of over Rs. 100	51,163
“ “ “ under Rs. 100	78,122
Total - - -	129,285

The next class are the holders of leases from the landowners, which leases, by a process of sub-infundation are carried on through several degrees—

Holders of leases direct from the estate	362,698
“ of sub-leases in the 1st degree	265,726
“ “ “ 2nd “	75,965
“ “ “ 3rd “	15,168
“ “ “ 4th “	2,728
Total - - -	724,310

Of these leases and sub-leases there are—

Over Rs. 100 - - - - -	103,916
Under Rs. 100 - - - - -	620,394

There is no record of the different classes of cultivators, shewing the possession of rights to fixed or occupancy tenures, &c, but the numbers of cultivators are given, classed according to the rent they pay—

Paying rent over Rs 100 per acre -	25,241
“ “ from Rs. 50 to Rs 100 -	119,617
“ “ from Rs 20 to Rs. 50 -	682,353
“ “ from Rs. 5 to Rs. 20 -	2,789,409
“ “ less than Rs 5 -	6,136,269
Total - - -	9,752,884

Thus then there are near 10 million tenants, representing a population of about 45 millions; and adding in the landowners and leaseholders, 850,000, the agricultural population must be about 47½ millions of people having a direct interest in the land, besides the field-labourers.

CENTRAL PROVINCES.

1 The agricultural statistics supplied by this province consist of statements shewing the annual cultivated area in each district with the acreage under each crop. It is not stated how these are drawn up—on what date each village is visited in order to prepare the record of the crop on the fields; nor whether it is

visited once in the year or during each harvest; nor what supervision is exercised over the work by superior officers. No attempt is made to record the twice-cropped lands, and no mention is made of fodder crops which, however, in a country containing so much waste and forest, are probably not extensive. The following

remarks are made by the Provincial Compiler, Mr. Nicholls:—

"Great trouble is taken to get patwaris to give correct returns, or in those districts where there are no patwaris, to obtain them from the malguzars. Probably the total areas under each kind for fields long under cultivation are pretty correctly given. Where two or more crops are grown in the same field, the difficulty is greatly increased; and probably in districts where the area of cultivation is rapidly extending, the newly broken lands are sometimes omitted for a year or so. Accordingly, I am inclined to think that our area is under-stated."

2 The result of these statistics is as follows.—The total cultivated area of the province is 15,517,796 acres, of which 13,053,672 acres, or 84 per cent., are under food-grains; and as the population by the census of 1872 was found to be 8,201,519, this gives 1.9 cultivated acres, and 1.6 acres under food-crops, per head—a very large proportion, indicative of rude cultivation and of a low average outturn. Of the food-crops one-third is rice, and wheat is rather more than a quarter.

3 No estimate of outturn is annually made, but a statement has been compiled from the Settlement Reports, shewing what the Settlement Officers considered to be the average outturn of the different classes of crops in their respective districts. Putting them all together, the result (which appears to be accepted by the Local Government) is that on an average the outturn of all crops is 511 lbs. per acre. Taking the estimated outturn of each crop separately—

That for wheat is - - - 492 lbs. per acre.
 " " rice is - - - 599 " "
 " " other crops - - - 449 " "

and the entire production of the year is 83,410,247 maunds, or 2,978,900 tons.

The local estimate for human consumption is five maunds per head per annum, or about 1 lb. 2 oz. per diem; at this rate the total quantity taken as food is 1,164,500 tons, or almost exactly half the estimated outturn. For seed-grain the calculation is a very high one—rice, 1½ maunds, wheat, 1 maund; other grain, ½ of a maund; the total quantity required for seed is 462,450 tons.

An allowance is made of half a maund per head, or 146,459 tons for wastage, cattle-food, &c., but this is undoubtedly too small; wastage at 5 per cent. on the outturn alone amounts to 148,945 tons, and cattle-food, at the Punjab rate of one-third maund per acre (no better being forthcoming), amounts to 184,750 tons. The total necessary consumption under these heads up to 2,200,000 tons, leaving a surplus of 718,000 tons.

The trade statistics kept up by the local administra-

tion in which all imports and exports from the province are recorded, cannot be relied on as absolutely correct, but they probably are approximately so, and they can no doubt be trusted when they shew that there is a considerable export of food-grain from this province. The average net export for five years (1873-78) is returned as follows —

		Average of 5 years. Export of 1877-78.	
		Tons.	Tons.
Wheat - - -	-	80,000	134,000
Rice - - -	-	21,900	80,000
Pulses - - -	-	60,000	26,400
Other spring crops -	-	18,500	50,000
Millets - - -	-	34,500	32,400
Total - - -	-	215,000	323,000

Now if the amount which could be sent away under the pressure of abnormally high prices in the year of largest known export and after a very good harvest was only 323,000 tons, we may be quite sure that the normal annual surplus above necessary consumption is less than that sum, and therefore that the figures which bring out a normal surplus of 718,000 tons are in error to the extent of at least 500,000 tons, by which sum either the outturn is overrated or the local consumption underrated. It is probable that both these causes of error have been at work. The estimated outturn is very much higher than that of Berar and Bombay, and though the Central Provinces have some very good land, a great deal is extremely poor; while on the other hand the human consumption should probably be raised to what is found to be the average elsewhere in the parts where millets and cereals are eaten, or 5½ maunds instead of 5 maunds per head. This change would raise the year's consumption to 2,445,000 tons; adding 300,000 tons for export, the maximum outturn that it is reasonable to assume is 2,745,000 tons, which comes to 475 lbs. per acre †

7. The irrigated area is returned as 775,000 acres, or 5 per cent. of the total cultivated area, but it is not stated whether these figures are entered in the annual village papers, or are derived from the survey records of the settlements. No information is given as to the number of cattle.

8 The agricultural statistics are not compiled so as to shew the number of persons holding or cultivating land under the various tenures that exist in the province (though no doubt this could easily be done) but the number and area of the different classes of holdings are given as follows; the second column is taken from the census return of occupations, and probably serves only to shew how far that return is from accuracy.—

Class of Holding.	Number of persons	Number of holdings.	Area.	Average area per holding.
Proprietors - - -	71,213	Not given	3,930,763	
Absolute occupancy tenures - - -	103,059	149,715	2,994,300	19½
Conditional do. do. - - -	211,843	121,807	1,948,912	15½
Tenants-at-will - - -	689,819	469,031	6,566,434	14
Service tenures - - -		51,073	204,292	4
Total - - -	1,075,934	791,586	15,644,701	

9 Nothing is said in reply to the question whether the Local Government would suggest any improvements in the system of collecting such statistics as these. A reference to the former letter of the Chief Commissioner and a consideration of the statistics now presented lead to the following conclusions:—

	Acres
*Wheat - - -	3,471,122
Rice - - -	4,523,670
Other food-grains - - -	5,058,760
Total food-grains - - -	13,053,552
Oil-seeds - - -	1,350,397
Sugarcane - - -	107,803
Cotton - - -	802,437
Other fibres - - -	26,082
Tobacco - - -	49,041
Vegetables - - -	51,970
Others - - -	76,512
Total non-food grains - - -	2,464,244
Grand Total - - -	15,517,796

† See Section I of this Note.

1st That power should be given by a legislative enactment to compel the appointment of a village accountant in every village or group of villages

2nd That rules should be laid down under which the village accountant should visit twice a year towards harvest time the villages in his charge, and should prepare a statement shewing the crops on each field, with an abstract of it shewing the area under each crop;

† The figures should therefore, in all probability, be corrected as follows —

	Tons.
Outturn of food - - -	2,750,000
Consumption - - -	1,660,000
Seed-grain - - -	460,000
Cattle-food - - -	180,000
Wastage - - -	150,000
	2,450,000

Surplus - - - 300,000

the irrigated area and the acreage of each crop irrigated; and the number of cattle.

3rd. That an intermediate agency should be created between the village official and the tahsildar to supervise the preparation of the above returns, and to test a percentage of them.

BERAR.

1. Here, as was stated in Section 1, paragraph 35, a complete establishment of village accountants and of supervisors exists, but the agricultural statistics have not yet been brought to any high degree of perfection. The cultivated area under the different crops is annually returned, but it appears uncertain how far any information is given as to jagir and mam lands. The irrigated area is recorded but is extremely small: and no information can at present be given as to the number of ryots or the area they hold. The local officials, however, feel no doubt that all this information can be obtained without much difficulty: and it is probable that if more attention were devoted to the subject, the average outturn of the different kinds of crops could be estimated with some approach to accuracy.

2. The average cultivated area of the four years 1874-77 was 6,108,000 acres, and it appears to have been increasing very fast; for 1873 it was returned as 5,700,000 acres, while for 1877-78 the figure given is 6,532,000 acres. The population by the census of 1867 was 2,228,000 souls, but the number has no doubt risen a good deal since then: otherwise it would shew the unprecedentedly large ratio of 3 cultivated acres per head. The main details of the areas under different crops in 1877-78 are as follows—

Food Crops.

	Acres.
Jowari	2,600,809
Other millets	223,002
Rice	30,751
Wheat	524,454
Pulses	325,470

Total food-crops 3,704,486

Non-Food Crops.

	Acres.
Cotton	2,078,269
Oil-seeds	478,367
Tobacco	17,060
Spices	23,256
Garden crops	36,386
Miscellaneous	195,160

Total non-food crops 2,828,498

Grand Total 6,532,984

3. The estimates of produce are of the roughest kind, the main basis being the results of actual experiments made in the Government Farms at Akola and Amraoti. On the strength of these the outturn of jowari per acre has been assumed at 420lbs, of wheat and all other grains at 250lbs. These rates will give the following outturn:—

	Acres.	Tons.
Jowari	2,600,000	487,500
Wheat	525,000	58,500
Other crops	580,000	64,000
Total	3,705,000	618,000

giving an average outturn of 369lbs. per acre.

4th. That an adequate establishment should be kept up at the head-quarters of each district to compile these statistics for the district, and at the head-quarters of Government to compile them for the province, the latter being under a special officer, whose duties should correspond to those performed by Mr. Buck in the North-Western Provinces.

4. The local estimate of food consumption is a little over 20 oz. per head per diem for an adult, and half that for a child, or 5 maunds per head per annum for all the population: and for seed grain 24lbs. per acre, or $\frac{1}{3}$ of the produce. This estimate (multiplied by the population of 1867, which is undoubtedly too low) gives—

Food consumption of 2,228,000 people	400,000
Seed-grain-	34,300

Wastage and cattle-food are not included in the estimate, but they probably account, the one for 30,000 tons (at 5 per cent. on outturn), the other (at one maund per 3 cultivated acres) for 78,000 tons, leaving 68,000 tons as surplus. In the year 1877-78, about 40,000 tons of food-grains were exported, but it is not reported if this was much above the average. If not, this export and the food consumed by the extra population above the number returned at the census, account pretty well for the whole of the surplus

	EXPORTS.				IMPORTS.				Surplus Export.
	Wheat.	Rice.	Other.	Total.	Wheat.	Rice.	Other.	Total.	
1874-5	20.5	2.	323	345.8	16.5	154	72	242.8	103
1875-6	214	1	254	469	5.8	160.5	46.8	203.	266
1876-7	236.5	2	1,057.5	2196	16.7	130	72	219.	1977
1877-8	38.	11	1460	1509	90.3	217	174	481.	1028
1878-9	19.7	23	980	972.8	186.8	189	211.6	557.3	415.5
Total	—	—	—	—	—	—	—	—	3789.5
Average	—	—	—	—	—	—	—	—	757.9

Maunds. Three o's omitted. Average export 27,000 tons. Statement of import and export by rail, received from Comr. H. A. D. No. 4,650 of 7 Octr., 79.

5. Besides this surplus of food-grain for export, the Berar agriculturists have the immense area of 2,828,000 acres under non-food crops, over 2 millions of which are cropped with cotton, and produced enough in 1877-78, after supplying all local wants, to send about 1,700,000 maunds away by railway, the value of which was 26½ millions of rupees, or four times the Government assessment of the land. There can be little doubt, therefore, as to the extreme prosperity of the people.

6. The irrigated area of 1876-77 was returned as 101,686

The irrigated area of 1877-78 was returned as 80,250

of which about 20 to 30 thousand acres were under rice, and the rest under garden crops: but these figures are confessedly very inaccurate. The irrigation is almost entirely from wells.

7. Although the system of land-tenure is the same as in Bombay, the same annual accounts have not been introduced, and among other returns, that which shews the number of ryots classified according to the area they hold is not drawn up. In 1875 the local officers stated the number of ryots to be 279,731; but even this information cannot be given now.

8. It is evident, from what has been said, that the material in Berar is good, and that with a little painstaking supervision, and with a systematised series of returns, it will not be difficult to obtain here a good set of agricultural statistics.

BOMBAY.

1. This Presidency possesses an elaborate set of agricultural and revenue forms which are prepared annually by the village accountant. They comprise a field register of all lands in Government villages, both Government and inam, and a yearly inspection, statement of crops, and produce of each field, whether Government or inam. But the statistics of production of alienated fields in Government villages are not carried forward from the village returns into those of the Taluka and Collectorate, and are, therefore, unprofitable: while the statistics of production which reach

the Government relate to Government land only; and of the cultivation and production of the numerous alienated villages no return at all is kept. Of the other village forms some relate to the land revenue and its collection, advances for land improvements, and other objects, sayer or miscellaneous revenue, lands set apart for public purposes, and allowances of hereditary officials. The Taluka returns are compiled from the village, and the Huzur from the Taluka returns; of the latter there are four, which bear on the subject of agricultural statistics.

2. The first is known as "Huzur form 16G" This contains a statement for each district of the assessed land in Government villages, distinguishing it as culturable, cultivated in the preceding year, and cultivated in the current year, and each of these heads is divided into irrigated garden land, dry crop land, and rice land. But the term "cultivated" is misleading, and should be replaced by the term "occupied," as it means not actually cultivated, but land which is "occupied" only, or taken up for cultivation.

3. The second statement ("Huzur form 17H") gives the details of the actual cultivated area of each district, shewing the acreage under each of 35 crops, the seed per acre, the yield per acre, and the outturn of crop; it also shews the twice-cropped areas and the fallow land; the actually cultivated and the fallow together make the occupied area of the preceding statement. This form also applies only to assessed lands in Government villages, excluding all inam villages and also inam lands in Government villages. The figures for seed and yield per acre do not seem to be at all checked, and are often wildly extravagant.

4. The object of the third form, or No 9, is to shew the incidence of the Government demand on different classes of land. It gives the occupied Government land of the year, divided under garden, rice, and dry crop (these figures agreeing with those in 16G), and the alienated land paying quit-rent, with the Government demand or the quit-rent against it. It does not, however, take any note of such alienated land as pays no quit-rent.

5. The fourth form (No. 26 Q.), shews the number and extent of occupancies in Government and inam lands, dividing them by their areas, under 5 acres, from 5 to 10 acres, and so on; and adding the number of acres thus occupied. This area, however, seldom agrees with the area stated in form 9 or anywhere else.

6. It is possible, then, to ascertain from form 17H, the cultivated area and the acreage under each crop for the assessed Government lands, or nearly the total; but some villages, even though paying quit-rent, have not been surveyed. From form 9, the total inam area paying quit-rent can be learnt; and on the assumption that the same proportion of the inam area will be cultivated, and cultivated with the same crops, as is the case in the Government area, an approximate statement can be made out to shew the area under the different food and non-food crops in the country, omitting only that part of the alienated land on which no quit-rent is paid, the area of which is understood not to be large. The following statement has been drawn up on this method, and shews the actual average

*	Government *	Inam paying quit-rent.*	Total.*	Government and Inam *
	Average of 3 years, 1873-76.		1876-77.	
Total area	21,871	6,552	28,423	28,563
Cultivated	18,957	5,679	24,636	17,658
Fallow	2,914	873	3,787	10,905
Wheat and barley	1,186	355	1,541	934
Jowari and bajri	9,904	2,967	12,871	8,876
Lesser millets	1,546	462	2,004	2,385
Rice	1,147	343	1,490	1,455
Pulses	1,006	301	1,307	1,255
Total food crop	14,785	4,428	19,213	14,905
Tobacco	—	—	—	47
Sugarcane	—	—	—	77
Spices	—	—	—	122
Cotton	—	—	—	1,461
Other fibres	—	—	—	53
Oil-seeds	—	—	—	1,021
Dyes	—	—	—	45
Miscellaneous	—	—	—	181
Total non-food crops	4,172	1,251	5,423	3,007

* Three 0's omitted.

area recorded as cultivated and cropped with food-crops in the returns of three normal years, 1873-76, in the assessed Government lands of all the districts in the presidency excepting Sindh and the North Kanara District, which is not yet surveyed, together with the estimated corresponding areas in the quit-rent land; it also shews the areas cultivated and cropped in the famine years of 1876-77, calculated on the same principle for both Government and quit-rent lands. This comparison supplies a test which, to a certain extent,

guarantees the accuracy of crop returns, for the cultivated area is known to have fallen off in these years of drought, and the agricultural returns shew the decrease to have amounted to seven million acres, or 28 per cent. The decrease too is greatest in the non-food area, as would *prima facie* be probably the case; it is 44 per cent. there, and only 22 per cent in the case of food crops.

As the population of the Presidency according to the census of 1872, and including Sindh and North Kanara, is 13,392,000, there are in ordinary years about 1 84 cultivated acres to each person, of which 1 44 acres are under food-crops

7. How little confidence can be placed on the estimate of outturn contained in the agricultural statistics (form 17H) is shewn by the fact that the total outturn for 1876-77 of the Government area under food-crops, 11,480,000 acres, is returned as 917,000 tons, which is not sufficient to feed five million people for a year; the average outturn per acre is put at 177lbs. per acre, and as there are 1 44 food-growing acres per head, the production of food per head is 256lbs, or much less than the lowest estimate of consumption per head per annum. These estimates may therefore be dismissed as unworthy of consideration.

8. Although a few experiments have been made by district or survey officers as to the outturn of crops, they are too few to be relied on to frame a general average, and the official records of the experiments generally shew only the value and not the weight of the crop. No expert appears to have paid any special attention to this subject in Bombay, or to have worked out any careful calculation of the probable production of food in the Presidency. It is hopeless, therefore, to attempt to make any such detailed calculations as have been given for the Punjab or the North-Western Provinces, but some general considerations may be laid down which will define the limits which no reasonable estimate can overpass.

9. It may be asserted with confidence that the outturn of food in the Presidency, and speaking broadly in each district of it, must equal the requirements of the population for food for themselves and their cattle and seed-grain, besides leaving a margin for wastage and shrinkage and probably for some amount of export. It is necessary therefore, in the first place, to consider what these requirements amount to.

10. The quantity of food required for a year's consumption has been established on a review of the information collected regarding all the cereal and millet-eating population of India as averaging 1 1/2 lbs per diem, or 5 1/2 maunds per annum, for 13,392,000 persons the quantity required is 2,785,000 tons. For seed-grain, taking the Madras estimate for rice and millets and pulses, and the Central Provinces estimate for wheat we have —

	Area	Rate per acre lbs.	Seed-grain. lbs.
Wheat	1,541,000	at 80	123,280,000
Rice	1,490,000	at 57	84,930,000
Millets and pulses	16,182,000	at 20	323,640,000
Total seed-grain			531,850,000
			or 237,000 tons.

With regard to cattle-food, our information is very scanty at the best, and none whatever has been afforded regarding Bombay. The estimate framed in the North-Western Provinces is 1/2 maund per cultivated acre, but there the cattle have harder work, being constantly employed at the wells for three or four months; in the Punjab the estimate is 1/3 of a maund per acre. At the latter rate the consumption by cattle is 6,400,000 maunds, or 230,000 tons. In wastage and loss by dryage, &c., the usual estimate is 5 per cent. The total outturn of food, after allowing for a moderate surplus to meet deficiencies of bad grain and export, must be not far short of 4,000,000 tons, therefore exceed the total requirements, or 3,250,000 tons. In order to effect this, the average outturn of 19,213,000 acres must be nearly 6 maunds, or 470lbs., or about 7 1/2 bushels per acre. The general average per acre in Madras is 627 lbs., in Berar 369lbs., in the Central Provinces 475lbs. From this it appears that the productiveness of land in the Bombay Presidency must approach most nearly to that of the Central Provinces, being probably identical with it in the Dekkan, but exceeding it considerably in respect of the richer province of Guzerat and the rice-growing lands of the Konkan

10a. Including Sindh and Kanara, and using the same

proportional figures, we get the following account of the food supply of the Presidency :—

	Tons.
Consumption of 16 millions at 5½ maunds per head	3,300,000
Seed-grain, 21,500,000 acres	290,000
Cattle food	260,000
Wastage	210,000
Surplus (say)	350,000
Total	4,500,000
Outturn of 21,500,000 acres at 470lbs per acre	4,500,000

11 It would be useless at present to go further into detail and to suggest probable average rates per acre for the different crops. What has been said is sufficient to shew the direction which agricultural research ought to take in the Bombay Presidency. Less exclusive attention should be paid to government lands and more efforts be made to ascertain the total cultivated area under each main class of crop; the returns, which are now prepared in a perfunctory way (the totals frequently being incorrect, many details deficient, and the figures of a preceding year evidently repeated at times without alteration) should be more carefully checked and tested, and information should be collected on a wider and sounder basis than hitherto, regarding the yield of the land, the object being not so much to prove that the assessment bears a low ratio to the gross value of the produce, as to ascertain the true economic condition of the agriculturalist. It will be necessary to obtain legislative power for requiring that a field survey should be made in all alienated lands, and that annual statistics of cultivation and production should be rendered. The inter-provincial trade statistics should also be registered, since the very first point that has to be decided in order to guide the calculation of produce is, whether the country as a whole imports any part of

the food-grains required for the consumption of its people, or grows a surplus for export.

12. The information contained in the Bombay returns regarding the extent of irrigation is extremely imperfect, and mainly from the same cause as that already noticed, that the attention of the officials is more given to the figures that concern the Government revenue than to those that concern the agricultural condition of the country. No attempt is made to record the actual irrigation, but only the area which pays an irrigated revenue to Government; and even this is done very imperfectly; while no return is maintained of the land which is irrigated from wells or other sources constructed by ryots at their own expense, from which Government takes no extra assessment. All land is, however, classified at the time of settlement as belonging to one of three classes, dry, garden, and rice land: and the average occupied land of the three years 1873-76 is divided thus:—

Class of land.	Average area for three years.	Per cent.
Total occupied land	21,871,000	
Dry	20,496,000	93·7
Garden	373,000	1·7
Rice	1,002,000	4·6

The "garden land," it may be presumed, can always be irrigated by wells: of the rice land some will suffer no doubt in a year of drought, but most of it is either protected by tanks and channels, or else lies in the Konkan, where there is no practical fear of drought; so that it may probably be said that 5 per cent. of the cultivated area of the Presidency is safe from the effects of drought.

13 The statistics of the area paying an irrigated revenue to Government are as follows; but they do not seem to be altogether trustworthy:—

DISTRICT.	Average Govern- ment area cultivated for three years 1873-76	Irrigated area	CANAL DEPARTMENT.		Area actually irrigated in 1877-78 by Canal Department.
			Area commanded by works having		
			an unfailing supply in autumn.	a supply dependent on local rainfall.	
GUJERAT.					
Ahmedabad - - - -	908,540	50,300	—	34,068	Figures not yet received.
Kaira - - - - -	461,924	56,446	—	9,751	
Broach - - - - -	415,262	Not given.	—	—	
Surat - - - - -	393,095	52,647	—	—	
Total of Guzerat - - -	2,178,821	159,393	—	—	
DECCAN.					
Khandeish - - - - -	2,167,172	11,819*	39,346	584	
Nasik - - - - -	1,394,463	47,691	13,336	—	
Ahmednagar - - - - -	2,151,676	37,458	29,408	1,530	
Poona - - - - -	1,659,484	61,033	20,955	585	
Sholapur - - - - -	1,849,840	54,021	—	10,971	
Satara - - - - -	1,325,843	43,187	26,827	16,774	
Kaladgi - - - - -	1,980,222	9,786	—	—	
Balgaum - - - - -	968,922	17,357	—	—	
Dharwar - - - - -	1,356,864	63,166	2,467	350	
Total of Deccan - - -	14,856,486	345,518	132,339	74,643	

* The Collector of Khandeish, in his reply to the Famine Commission (pages 360 and 366 of Bombay Compilation), says that 5,950 acres are irrigated by Government works, and over 10,000 by old works executed before the British rule; the latter pay a revenue of Rs 77,000.

According to these figures, the irrigated area is not much less than the area of garden land given in the preceding paragraph, but there is good reason for holding that the irrigated area is greatly in excess of this. It must be explained here that the term "commanded" is used by the Irrigation Department to designate the area to which it is possible for the canals or channels to convey water: it does not imply that there is a sufficient supply of water to irrigate all this area in the course of one year. On the other hand, the area actually irrigated is much less than that for which there is a sufficient water-supply; but there is great unwillingness to take this water, the cause of which is discussed elsewhere.

14 In Sindh, the cultivation is almost entirely dependent on the supply of water from the inundation

canals which fill as the Indus rises. The canal reports give the following figures:—

	Cultivated. Acres.	Irrigated. Acres.
1875-76	1,966,000	1,551,200
1876-77	2,389,650	1,842,500

from which it would appear that there are some 400,000 or 500,000 acres cultivated without irrigation; these are mostly either lands in the bed of the river, or lands flooded direct from the river without the intervention of canals. But it seems impossible at present to state accurately the area actually cultivated or irrigated. The system of the settlement was to break the land up into large blocks, and to give these out in "occupation," on the assumption that the occupying ryot would cultivate one-third of the block in each year, giving it two

years fallow: this assumption has proved inaccurate, and the land is consequently being resurveyed; but it seems that no statistics exist of the actual cultivation, the figures showing only what portion of the "occupied" area ought to be cultivated if the above assumption were correct. Speaking broadly, no cultivation is possible in Sindh, except with the help of river water, and almost all the land is sown with autumn crops.

15. The statement of occupancies (26 Q.) accounts for 26 405 653 acres out of the total 28,563,000 acres in Bombay proper (excluding Kanara) shewn in the sixth paragraph. The number and classification of holdings were as follows in 1876-77.—

Under	5 acres	-	-	-	No
From	5 to	10 acres	-	-	505,071
"	10 "	20 "	-	-	232,329
"	20 "	50 "	-	-	249,006
"	50 "	100 "	-	-	260,398
"	100 "	200 "	-	-	86,906
"			-	-	23,242

MADRAS.

1. The agricultural statistics of this Presidency are fairly complete, and the results have been worked up with much care and attention by the Board of Revenue, whose reply to the Famine Commission shows clearly what indications may be drawn from them, and in what respect the figures are doubtful and incomplete.

2. The annual village records contain the area cultivated under each crop in Government (i.e., ryotwari) lands, and in inam holdings within the Government villages, but no such returns are sent up from the zemindaris, and all that is possible is to estimate that the same proportion of their total area is cultivated and the same proportion of cultivation is under food-crops as in the Government lands. The opposite are the figures thus obtained in millions of acres.

Here the fact that so large a proportion as 5½ millions of acres or 25 per cent. of the food-crop area is obtained by an untested estimate and not by survey, cannot but throw some doubt over any deductions that may be drawn. Nor is the area of Government lands (which is

From	200 to	300 acres	-	-	No
"	300 "	400 "	-	-	3,483
"	400 "	500 "	-	-	989
"	500 "	750 "	-	-	400
"	750 "	1,000 "	-	-	391
"	1,000 "	1,500 "	-	-	139
"	1,500 "	2,000 "	-	-	125
"	Over	2,000 "	-	-	55
Total					1,367,622

The average occupied area for each ryot is 19 acres; the average cultivated area will therefore be about 16 acres. This statement, however, is prepared in a very misleading manner: each jagir or large inam, as well as each taluka or khote tenure, is shown as a single holding, there being no information as to the sub-tenants, who are the real occupants in such estates. It would be easy, however, to prepare this statement so as to show ryotti holdings apart from others.

	Cultivated area.	Area cropped, including Dotasli.	Area under food-crops.
Government lands and inam	22½	24½	20½
Zemindaris (estimated)	6	6½	5½
Total	28½	31½	26

the average of the returns of four years, 1873 to 1876) absolutely trustworthy, for two of the districts, Malabar and South Kanara, have never been surveyed, and in such cases the area is always found to be underrated. The following table shews how these considerations bear on the probable accuracy of the figures:—

DISTRICT.	TOTAL CROPPED AREA IN ACRES.		TOTAL.	Population.
	Government and inam.	Zemindari.		
Ganjam	424	733	1,157	1,520
Vizagapatam	115	1,181	1,296	2,159
Godavari	969	511	1,510	1,592
Kistna	2,119	534	2,653	1,452
Nellore	1,075	852	1,927	1,376
Cuddapa	1,734	—	1,734	1,351
Bellary	3,532	44	3,576	1,668
Karnul	2,095	58	2,153	950
Chingleput	506	77	673	938
North Arcot	739	393	1,132	2,015
South Arcot	1,282	9	1,291	1,755
Tanjore	1,306	72	1,378	1,973
Trichinopoly	1,003	159	1,162	1,200
Madura	982	964	1,946	2,266
Tinnevely	1,202	625	1,827	1,648
Coimbatore	2,497	61	2,558	1,763
Nilgiris	51	—	51	49
Salem	1,505	511	2,016	1,966
South Kanara	581	—	581	918
Malabar	904	3	907	2,261
Madras City	—	—	—	397
TOTAL	24,711	6,817	31,528	31,281

Three 0's omitted.

It appears at a glance that while the total population is almost exactly equal to the number of cultivated acres, it is very much larger than that number in the two unsurveyed districts, and in the three districts (Ganjam, Vizagapatam and Madura) where the estimated zemindari area is greater than, or equal to the surveyed Government area; while it is much less in the surveyed districts, where there is little or no zemindari land. This strengthens the conclusion that the estima-

* The Census Report shows the population of the zemindaris apart from that of Government and inam villages, and the figures may be compared thus.—

	Cultivated area.	Population.
Government villages and inam	22,500,000	23,714,000
Zemindari	6,000,000	7,567,000

The proportion of cultivated land to population is much the least in the zemindaris.

ted area is underrated, and that the only figures which are sufficiently near the truth to build any argument upon are those for the 15 surveyed districts in which not much zemindari exists. For these the population is 23,157,000, the cultivated area 25,841,000 acres, and the food-crop area 21,455,000. The cultivation under food-crops is divided thus:—

	Acres.
Rice	5,067,000
Great Millets	8,476,000
Lesser "	4,929,000
Pulses	2,344,000
Miscellaneous	639,000
Total	21,455,000

3. No annual estimates of outturn are sent up and no

attempt is made to shew, year by year, the variations in actual weight of the crop produced. The Settlement Department has, however, of late years made a vast number of calculations of outturn, based on actual experiments in measured areas, and in the districts not recently surveyed estimates have been prepared by the district officers, some of which do not seem to be worthy of much credit, and have been rejected by the Board. Putting all these data together, the following are the average figures accepted by the Board of Revenue for the whole Presidency:—

	lbs per acre	Produce in the 15 districts.
Rice*	1,132	2,561,000
Greater millets	579	2,192,000
Smaller "	862	1,897,000
Pulses	450	470,000
Miscellaneous	600	168,000
General average	765	7,288,000

4. With regard to human consumption of food, estimates have been prepared by all collectors which vary considerably, the most general assumption being that the daily quantity consumed by an adult male is 2lbs. Dr. Cornish, however, the Sanitary Commissioner, prefers to be guided by the jail ration of 1½lbs for an adult male or female, and 9oz. for a child below 10 years, or which gives an average of about 1½lbs. per head per diem, or 5½ maunds per annum for the whole population. At this rate the food consumed by the 22,157,000 people in these 15 districts is 4,468,000 tons, or about 5 to a ton.

Seed-grain.—The average assumed is for rice 86lb. of paddy (equal to 57lbs. of rice) per acre, and for millets 20lbs. per acre, making a total amount of 275,000 tons, or about 8 per cent. of the produce.

No estimate is framed of the loss by wastage and of the consumption by cattle. Taking the former at the usual rate of 5 per cent, and the latter (for want of a better guide) at the Punjab rate of 1 maund to 3 cultivated acres, and adding in the exports of rice by sea to other countries, which averaged about 100,000 tons up to the famine year of 1876-77, we have the following calculation:—

	Tons.
Total outturn of 15 districts	7,288,000
Food of the people	4,468,000
Seed-grain	275,000
Wastage	314,000
Food of cattle	300,000
Exports by sea	100,000
Total	5,457,000
Surplus	1,831,000

On the same proportionate ratio we should have for the whole country:

	Tons.
Total outturn of food grain	10,300,000
Food of 31 millions	6,300
Seed-grain	400
Wastage	520
Cattle food	420
Exports by sea	100
Total	7,740
Surplus	2,560

Thus about 25 per cent. of the produce is unaccounted for, a proportion so large that it throws doubt on all the figures, and shows forcibly how rough the estimates are. And when the figures are more closely examined in detail, and it is seen how greatly the estimates of produce and of seed-grain vary in adjoining and similar districts,† it is obvious that this

* The estimates were made on paddy, and rice has been taken as two-thirds of paddy.

† e.g.—	Paddy seed per acre.	Produce in Rice.
{ Bellary	150	900
{ Cuddapah	58	1,465
{ Godavari	41	
{ Kistna	108	
	Produce per acre.	
{ Bellary	900	
{ Cuddapah	1,465	
{ Salem	1,222	
{ North Arcot	1,667	

branch of agricultural statistics is open to much improvement.

It is, however, more probable that the rate of outturn is exaggerated than that the rate of consumption is underestimated. A produce rate of 765lbs. per acre is moderately high, when compared with the estimates of Bernar and Bombay, for although much of the Deltaic and low-lying soil in Madras is extremely fertile, much of it is thin and poor, and there is a large tract which corresponds exactly to the Bombay Dekkan. Such a produce implies a surplus above consumption of from one-half to one maund per acre, and in order to justify this the Province should have immensely large exports.

Working backwards from the acknowledged consumption and the probable surplus to the possible outturn, the following figures may be substituted as more reasonable than those adopted by the Board of Revenue:—

	Tons.
Consumption of 31 millions at 5½ maunds	6,300,000
Seed-grain	400,000
Cattle food	440,000
Wastage	420,000
Probable surplus	940,000

Total outturn - 8,500,000

On a probable area of 30 million acres the outturn per acre will be about 627lbs., or 7½ maunds, or 10 bushels per acre.

5. With regard to irrigation, the ordinary returns, annually prepared shew only the amount for which irrigated rates are charged by Government, i.e., the area irrigated from sources supplied and controlled by the State, such as canals and tanks; the lands irrigated by wells, or tanks constructed by private persons, are not recorded as irrigated in these returns. The total area thus registered as irrigated is as follows:—

	Acres.
Ryotwari lands	3,966,765
Inam and zemindari lands	1,356,129
Total	5,322,894

Of this about 2,100,000 acres are supplied by the great canals constructed by the British and by former Governments. The number of private wells in ryotwari lands is believed to be about 375,000, but for the reasons stated above, the area irrigated from them is not registered.* For the most part only garden crops are grown by the help of these wells, and the whole of the 5 million acres irrigated from Government sources may be said, broadly speaking, to be cropped with rice.

6. The annual village papers shew the number of ryots holding Government land, and these are classified for the whole Province in an annual return,† which shows how many more there are holding land assessed at less than Rs. 10, from Rs. 10 to 30, from Rs. 30 to 50, and so on; those who jointly hold land in more names than one are recorded separately, but not classified. The total number of holdings is 2,392,000. The number of ryots is larger, inasmuch as the "joint holdings" represent more than one person, and the larger ryots have several sub-tenants; thus it is roughly estimated that the number of adult male ryots in Government lands is about 4 millions. The cultivated area being 22½ millions of acres, each ryot has about 5½ acres. At the same ratio the 6 million acres of zemindari lands will stand for about one million ryots, and the total number of landed persons, heads of

* If it may be estimated that an area of 5 acres is watered by each of these wells, we may add 1,800,000 acres to the irrigated area, which will then be about 7 million acres, almost all of which is in Government land. This would give a ratio of 31 per cent. irrigated out of 22½ million acres.

† Single puttas, under Rs. 10	125,175
From Rs. 10 to 30	455,716
" " 30 to 50	191,563
" " 50 to 100	79,085
" " 100 to 250	31,737
" " 250 to 500	5,288
" " 500 to 1,000	1,399
Above	401

Total single puttas	1,046,929
Joint puttas	445,135

Total number of holdings - 2,392,064

It would be better if the areas were given instead of or as well as the assessment (as in the Bombay return), and if the distinction between joint and single puttas were abolished.

families, is about 5 millions, representing a population of about 16 million souls.

7. This review of the agricultural statistics actually supplied leads up to the consideration of what suggestions can be made for their improvement. Obviously almost the first thing is, as the Board of Revenue proposed in 1875 and now propose again, that legal power should be taken to enforce the rendition of accounts in the zemindari estates; but even before this comes the necessity of completing the survey of the unsurveyed districts, and of carrying out a cadastral survey and record of rights in the zemindaris. The record of cropped areas requires careful supervision to secure accuracy, and to avoid the common mistake (which, there is reason to believe, largely affects the Bellary

figures in particular) of confusing cultivated land with occupied fallow for which rent is paid, but which is not cropped; the area actually irrigated should be shown, and not only the area on which irrigated rates are charged; and the number of tenants might be shown as well as of holdings, and the area they occupy; in this respect something may be learned from the Bombay figures.

An establishment of supervisors is also required, and the appointment of a head official over the agricultural Department, who would be able in time to work out more trustworthy estimates of the average produce of the land than at present exist in the districts where the Settlement Department has not been at work.

AJMIR.

Agricultural statistics have been altogether neglected in Ajmir, and it appears that even in Government villages the annual papers required elsewhere from the village accountants are not rendered.

The local officers, both in reply to the Questionnaire and to the Famine Commission, sent in one set of figures, viz., those prepared at the time of the settlement, and they assert that no others are in existence. What figures they possess refer only to Government or khalsa lands, not to the istamar villages, regarding which next to nothing is known. In preparing the form required for the Questionnaire, it was calculated that the area cultivated in the istamar villages was equal to that in the Government villages, the total being 403,000 acres. Now an estimate is made that in the former alone the cultivated area is 411,520 acres,

while that of the Government villages is 175,000 acres, of which 145,000 are under food-crops. The average outturn of the former is estimated at 11 maunds per acre, of the latter 6 maunds; such guesses are clearly not worth consideration. It is, however, most important that a new system should be followed in Ajmir, and the same class of statistics prepared here, both for khalsa and istamar lands, as in other parts of British India. No district has suffered more severely from famine than Ajmir, and in hardly any part of India is the rainfall more precarious; but if the occasion again arose, and if there was a prospect of drought and distress, the local officers would be utterly unable to prepare a reasonable forecast or to give any accurate accounts of the agricultural resources of the country.

MYSORE.

Mysore has sent up no agricultural statistics to the Famine Commission. Apparently the labor of closing the famine relief-works, and the preparation for the approaching change in the administration, has occupied the local Government's attention too completely. The province has however a very complete system of agricultural statistics based on that adopted in Bombay; and from figures obtained when on the spot, the following abstract is drawn up.

The population of Mysore was by the last census about 5 millions: the cultivated area in 1870-77 was 4,328,000 acres, and the cropped area amounted to 5,530,000 acres, which indicates an extraordinary amount of double-cropping, mainly in the rice land. The area under food-crops was 5,073,000 acres, of which 444,000 were sown with rice, an unusually small quantity, due to the drought. The more usual division would be about 800,000 acres to rice, and 4,200,000 to dry grains, principally ragi. The following is the local estimate of outturn:—

or 1,543,000 tons, at 690 lbs. per acre. The consumption is estimated as follows:—

	Maunds.
Human food, 5,055,000 at 6 maunds	30,330,000
Cattle food, at 1/2 maund per acre	1,700,000
Seed-grain	1,340,000
Wastage, at 5 per cent.	2,160,000
Total requirements	35,530,000

Leaving a surplus of 6,670,000 maunds, or 238,000 tons. This result agrees fairly with the well-known prosperity of the Province in ordinary years, but the surplus is considerably too large, and probably the estimate for dry grains is a good deal too high.

The following table sums up the more important of the conclusions drawn from the agricultural statistics of the different provinces, and shows clearly what a close connection there is between the density of the population per cultivated acre, and the produce per acre:

	Maunds
Rice 800,000 acres at 12 maunds	9,600,000
Ragi, &c., 4,200,000 at 8	33,600,000
Total	43,200,000

	Population by last census.	Cultivated area.	Food-crop area.	Number of Acres per head of Population.		Estimated out-turn of food-grain in lbs per acre.	Per cent. of irrigated to cultivated area.	
				Culti-vated.	Food growing.			
Punjab - - -	17,604	21,700	18,520	1.2	1.05	644	26.2	Excluding the hill districts,
North-Western Provinces and Oudh - - -	41,000	33,643	31,450	.82	.76	800	32.4	
Bengal - - -	60,000	54,500	48,500	.91	.81	960	2	
Central Provinces - -	8,201	15,517	13,054	1.9	1.6	511	5	Excluding Sindh and North Kanara
Berar - - -	2,228	6,533	3,705	2.9	1.66	369	1.3	
Bombay - - -	13,392	24,636	19,213	1.84	1.44	380	3	
Madras (15 districts) -	22,157	25,641	21,455	1.15	.97	642	31	Excluding South Kanara, Malabar, Madura, Ganjam, and Vizagapatnam.
Mysore - - -	5,055	5,530	5,073	1.1	1	690	16	
TOTAL - -	169,637	187,100	160,970	—	—	—	—	

* Three O's omitted.

AREA of Land Occupied and Cultivated in the Bombay Presidency—continued

District.	Population.	Class.	Years.	AREA OCCUPIED				Fallow.	Culti- vated Area.	Twice cropped.	Wheat and Barley.	Jowari and Rajm.	Teaser Milled.	Rice.	Pulses.	Total of Food Grains.	Tobacco.	Sugar- cane.	Condi- ments and Spices.	Cotton.	Other fibres.	Oil- seeds.	Dyes.	Miscellaneous.	Total area under crops.
				Total.	Dry Crop.	Garden.	Rice.																		
1	2	8	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Colaba	359,000	Government	1872-73	408	322	3	130	208	292	7	—	—	32	130	9	281	—	—	—	—	—	—	—	—	—
			1873-74	468	325	3	130	208	292	4	—	—	38	130	—	282	—	—	—	—	—	—	—	—	—
			1874-75	469	326	3	130	208	292	4	—	—	38	130	—	282	—	—	—	—	—	—	—	—	—
			1875-76	467	325	3	130	208	292	5	—	—	102	138	7	247	—	—	—	—	—	—	—	—	—
			Average of 3 years	467	325	3	130	208	292	4.5	—	—	110	130	11	290	—	1	—	—	—	5	—	—	209
Nasik	657,000	Inam	1876-77	471	328	3	140	206	293	8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
			1877-78	471	328	3	140	206	293	8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
			1878-79	471	328	3	140	206	293	8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
			1879-80	471	328	3	140	206	293	8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
			Average of 3 years	471	328	3	140	206	293	8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Khandesh	1,029,000	Government	1872-73	1,691	1,535	41	15	208	1,938	7	199	793	76	28	141	1,107	—	—	—	—	—	—	—	—	—
			1873-74	1,691	1,535	41	15	208	1,938	7	199	793	76	28	141	1,107	—	—	—	—	—	—	—	—	—
			1874-75	1,691	1,535	41	15	208	1,938	7	199	793	76	28	141	1,107	—	—	—	—	—	—	—	—	—
			1875-76	1,691	1,535	41	15	208	1,938	7	199	793	76	28	141	1,107	—	—	—	—	—	—	—	—	—
			Average of 3 years	1,691	1,535	41	15	208	1,938	7	199	793	76	28	141	1,107	—	—	—	—	—	—	—	—	—
Pant	—	Inam	1876-77	1,669	1,598	47	14	343	1,315	7	142	720	103	20	335	1,126	1	10	5	31	8	159	—	9	1,324
			1877-78	1,669	1,598	47	14	343	1,315	7	142	720	103	20	335	1,126	1	10	5	31	8	159	—	9	1,324
			1878-79	1,669	1,598	47	14	343	1,315	7	142	720	103	20	335	1,126	1	10	5	31	8	159	—	9	1,324
			1879-80	1,669	1,598	47	14	343	1,315	7	142	720	103	20	335	1,126	1	10	5	31	8	159	—	9	1,324
			Average of 3 years	1,669	1,598	47	14	343	1,315	7	142	720	103	20	335	1,126	1	10	5	31	8	159	—	9	1,324
Poona	907,000	Government	1872-73	2,383	2,351	31	—	210	2,274	3	144	1,019	27	22	130	1,375	4	2	2	535	1	309	15	12	2,277
			1873-74	2,383	2,351	31	—	210	2,274	3	144	1,019	27	22	130	1,375	4	2	2	535	1	309	15	12	2,277
			1874-75	2,383	2,351	31	—	210	2,274	3	144	1,019	27	22	130	1,375	4	2	2	535	1	309	15	12	2,277
			1875-76	2,383	2,351	31	—	210	2,274	3	144	1,019	27	22	130	1,375	4	2	2	535	1	309	15	12	2,277
			Average of 3 years	2,383	2,351	31	—	210	2,274	3	144	1,019	27	22	130	1,375	4	2	2	535	1	309	15	12	2,277
Ahmednagar	774,000	Inam	1876-77	1,857	1,797	40	27	337	907	8	33	634	103	36	54	860	2	4	6	1	1	34	—	7	915
			1877-78	1,857	1,797	40	27	337	907	8	33	634	103	36	54	860	2	4	6	1	1	34	—	7	915
			1878-79	1,857	1,797	40	27	337	907	8	33	634	103	36	54	860	2	4	6	1	1	34	—	7	915
			1879-80	1,857	1,797	40	27	337	907	8	33	634	103	36	54	860	2	4	6	1	1	34	—	7	915
			Average of 3 years	1,857	1,797	40	27	337	907	8	33	634	103	36	54	860	2	4	6	1	1	34	—	7	915
Ratnagiri	1,610,000	Government	1872-73	2,449	2,394	34	4	275	2,174	—	753	1,622	73	8	—	1,890	—	—	—	—	—	—	—	—	—
			1873-74	2,449	2,394	34	4	275	2,174	—	753	1,622	73	8	—	1,890	—	—	—	—	—	—	—	—	—
			1874-75	2,449	2,394	34	4	275	2,174	—	753	1,622	73	8	—	1,890	—	—	—	—	—	—	—	—	—
			1875-76	2,449	2,394	34	4	275	2,174	—	753	1,622	73	8	—	1,890	—	—	—	—	—	—	—	—	—
			Average of 3 years	2,449	2,394	34	4	275	2,174	—	753	1,622	73	8	—	1,890	—	—	—	—	—	—	—	—	—
Satara	1,571,000	Inam	1876-77	1,001	846	11	137	—	944	14	—	—	785	137	23	904	—	—	—	—	—	—	—	—	—
			1877-78	1,001	846	11	137	—	944	14	—	—	785	137	23	904	—	—	—	—	—	—	—	—	—
			1878-79	1,001	846	11	137	—	944	14	—	—	785	137	23	904	—	—	—	—	—	—	—	—	—
			1879-80	1,001	846	11	137	—	944	14	—	—	785	137	23	904	—	—	—	—	—	—	—	—	—
			Average of 3 years	1,001	846	11	137	—	944	14	—	—	785	137	23	904	—	—	—	—	—	—	—	—	—
Saurashtra	—	Government	1872-73	1,058	1,384	49	15	246	1,412	42	34	921	—	20	123	1,698	—	—	—	—	—	—	—	—	—
			1873-74	1,058	1,384	49	15	246	1,412	42	34	921	—	20	123	1,698	—	—	—	—	—	—	—	—	—
			1874-75	1,058	1,384	49	15	246	1,412	42	34	921	—	20	123	1,698	—	—	—	—	—	—	—	—	—
			1875-76	1,058	1,384	49	15	246	1,412	42	34	921	—	20	123	1,698	—	—	—	—	—	—	—	—	—
			Average of 3 years	1,058	1,384	49	15	246	1,412	42	34	921	—	20	123	1,698	—	—	—	—	—	—	—	—	—
Saurashtra	—	Inam	1876-77	1,421	1,352	43	15	251	1,170	25	29	733	61	19	127	1,699	—	—	—	—	—	—	—	—	—
			1877-78	1,421	1,352	43	15	251	1,170	25	29	733	61	19	127	1,699	—	—	—	—	—	—	—	—	—
			1878-79	1,421	1,352	43	15	251	1,170	25	29	733	61	19	127	1,699	—	—	—	—	—	—	—	—	—
			1879-80	1,421	1,352	43	15	251	1,170	25	29	733	61	19	127	1,699	—	—	—	—	—	—	—	—	—
			Average of 3 years	1,421	1,352	43	15	251	1,170	25	29	733	61	19	127	1,699	—	—	—	—	—	—	—	—	—

AREA of Land Occupied and Cultivated in the Bombay Presidency—continued.

District.	Population	Class.	Year.	Area Occupied.				Fallow.	Culti- vated Area.	Twice cropped Barley.	Wheat and Bajra.	Jowari and Mullela.	Rice.	Pulses.	Total of Grains.	Tubne- co.	Sugar- cane.	Condi- ment's and Spices.	Cotton	Other fibres.	Oil- seeds.	Dyes	Miscella- neous.	Total Area under crops	
				Dry Crop.		Garden.	Rec.																		
				Total.	6																				7
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Sholapur	718,000	Government	1873-74	1,983	1,834	53	3	170	1,772	—	35	1,453	83	15	124	1,711	—	—	—	—	—	—	—	—	—
			1874-75	1,920	1,871	60	2	128	1,801	—	40	1,341	47	21	72	1,421	—	—	—	—	—	—	—	—	—
			1875-76	2,147	2,082	63	3	171	1,976	—	38	1,507	13	19	183	1,735	—	—	—	—	—	—	—	—	—
			Average of 3 years	2,000	1,943	65	3	166	1,850	6	38	1,434	48	18	118	1,656	—	—	—	—	—	—	—	—	—
			1876-77	2,162	2,085	65	3	1,488	604	5	18	512	9	7	45	591	1	3	5	6	10	33	1	17	667 (D)
Belgaum	988,000	Inam	1876-77	215	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
			1873-74	1,113	1,062	8	63	131	982	4	48	513	—	87	87	697	—	—	—	—	—	—	—	—	
			1874-75	1,115	1,064	8	63	137	978	6	35	512	—	69	69	713	—	—	—	—	—	—	—	—	
			1875-76	1,115	1,064	8	63	168	947	68	48	506	108	69	63	823	—	—	—	—	—	—	—	—	
			Average of 3 years	1,114	1,053	8	53	145	969	22	45	511	36	68	86	745	—	—	—	—	—	—	—	—	
Dharwar	988,000	Inam	1876-77	1,114	1,053	8	53	463	651	47	9	384	96	68	92	619	7	4	8	30	1	16	—	698	
			1873-74	1,523	1,433	4	88	146	1,377	1	129	464	—	—	—	—	—	—	—	—	—	—	—	—	
			1874-75	1,510	1,439	4	87	163	1,347	2	112	503	23	91	—	785	—	—	—	—	—	—	—	—	
			1875-76	1,539	1,447	5	87	187	1,362	1	130	439	—	91	101	761	—	—	—	—	—	—	—	—	
			Average of 3 years	1,524	1,440	4	80	165	1,359	1	134	463	18	89	34	744	—	—	—	—	—	—	—	—	
Kalyadi	815,000	Government	1876-77	1,544	1,451	5	88	757	787	1	10	380	100	90	79	638	1	2	24	91	1	24	—	786	
			1873-74	841	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
			1874-75	2,012	2,006	4	2	51	1,961	1	104	1,453	—	6	—	1,563	—	—	—	—	—	—	—	—	
			1875-76	2,035	2,072	6	2	51	1,984	1	94	1,420	—	6	—	1,520	—	—	—	—	—	—	—	—	
			Average of 3 years	2,044	2,085	6	3	64	1,990	1	103	1,416	1	6	34	1,360	—	—	—	—	—	—	—	—	
Grand Totals	13,145,000	Inam	1876-77	2,099	2,066	9	4	1,569	350	1	3	502	6	2	12	325	1	1	2	15	1	2	—	551	
			1873-74	738	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
			1874-75	21,714	19,940	375	1,309	2,710	19,004	1,713	1,247	10,959	1,274	1,141	783	14,054	—	—	—	—	—	—	—	—	
			1875-76	21,621	20,534	362	1,255	2,819	18,602	1,741	1,090	9,671	1,414	1,185	710	14,020	—	—	—	—	—	—	—	—	
			Average of 3 years	21,870	20,496	372	1,402	2,613	18,657	240	1,156	9,694	1,542	1,147	1,008	14,756	—	—	—	—	—	—	—	—	
Grand Totals	13,145,000	Inam	Do do.	6,552	6,140	111	301	873	5,679	72	365	2,967	462	843	301	4,425	—	—	—	—	—	—	—	—	
			Do do.	28,422	26,836	493	1,503	4,786	24,636	812	1,541	12,871	2,004	1,490	1,507	19,213	—	—	—	—	—	—	—	—	
			1876-77	22,012	20,613	286	1,013	13,605	12,605	159	719	6,549	1,583	1,171	983	11,486	36	30	94	1,126	41	787	35	144	13,508 (E)
			1875-76	6,552	6,140	111	301	2,601	4,051	59	214	2,006	547	884	288	3,419	1	18	28	335	12	294	10	43	4,110 (F)
			Average of 3 years	25,564	23,749	501	1,314	10,905	17,659	215	933	5,876	2,355	1,455	1,256	14,905	47	77	122	1,451	54	1,021	48	186	17,915

A. This figure is 1,000 less than what it should be according to the figures in columns 10 and 11.
 B. Ditto is 13,000 in excess of what it should be according to the figures in columns 10 and 11.
 C. Ditto is 600
 D. This figure is 2,000 less than what it should be according to the figures in columns 10 and 11.
 E. Ditto is 11,000 in excess of
 F. Ditto is 3,000
 G. Ditto is 1,000 in excess of
 H. Ditto is 1,000 in excess of
 I. Ditto is 1,000 in excess of
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SECTION III.

PROPOSALS FOR IMPROVEMENTS IN THE FUTURE.

Defects still existing in Agricultural Statistics.

In the preceding section I have compiled and brought together the information which the Agricultural returns of the different provinces of India are now able to provide, and have shewn what improvement has been effected in them since the returns of 1875 were compiled, and what defects still remain and need to be cleared away. The improvement has been considerable in the North-Western Provinces, where no information at all was available in 1875, and now accurate statistics have been furnished of 24 districts, in other Provinces the returns are the same as before, but in the Punjab and Madras much skill has been shewn in putting them together and drawing out the conclusions to which they point as to the economic condition of the agriculturist and in the incidence of the land revenue on his profits. The defects which still remain to be cured arise from the inaccurate and perfunctory manner in which the village statistics are prepared, from the want of a supervising body to inspect and check those returns, and from the want of an establishment capable of compiling them into an intelligible whole for the district and the province.

First step. Improvement of the body of Village Accountants in all parts of India.

2 The first step to be taken in order to achieve these results is to organise the whole body of village accountants in each province and to bring them under complete discipline. In the Punjab it is understood that this has already been done to the satisfaction of the Local Government. In the North-Western Provinces a great deal has been done towards this end, and it only remains to carry out the same system in the remaining temporarily settled districts, in the permanently settled districts nothing useful can be done till the Cadastral Survey now in hand is finished, but as fast as the field registers are made out from the survey papers, they should be handed over to the patwaris as a fresh point of departure and the returns be maintained correct for the future. In Oudh the patwaris are not at present a body of Government servants at all. When the settlement was made after the Mutiny it was influenced by the desire of treating the talukdars as liberally as possible, and of creating for them a great position in which it would be their interest to work with and to assist Government; accordingly the responsibility of preparing the required returns was thrown upon them and they are allowed to employ whom they like to carry out the work. This principle is inconsistent with the higher ideal now accepted as to the perfectibility of these returns, it is impossible to secure accurate and conscientious execution of the duty unless the accountant is well educated and able to pass a simple examination in surveying and in arithmetic, such as is required in the North-Western Provinces and unless he is permanent in his post and looks to Government, not to the talukdar, for reward and approval. The same remarks apply to the Nagpore Division of the Central Provinces, and in both these places the Famine Commission might recommend that the system should not conform to that of the North-Western Provinces and the Punjab, as indeed the rest of the Central Provinces already does. In Bombay and Madras the position of the village accountant is a good one, and it seems that in respect of discipline and punctuality and general intelligence he is equal, if not superior, to the average village accountant of Upper India; the chief reform that is required here is that the system of field and crop records should be extended to the main lands and to the estates of talukdars in Bombay, and of large zemindars in Madras, the principle being that these returns are not exclusively needed for purposes connected with the collection of the Government revenue, but that their preparation is equally important for the sake of obtaining that knowledge of the state of the agricultural community, the most important of all interests in the country, without which general administration is at fault and administration of famine relief is altogether impossible.

Necessity of a Field Survey in Bengal.

3. With regard to Bengal it must be said, as of the permanently settled districts in the North-Western Provinces, that until a field survey is carried out, it is

impossible for any agricultural returns worth the name to be prepared, and that the establishment of a body of patwaris would be altogether useless without this essential preliminary. In order to carry out the scheme proposed by the Famine Commission, it will be essential to introduce the Cadastral survey into the Bengal Province, and to follow it up by organising an establishment of village accountants and an annual system of field records. It is impossible to overrate the importance of the information which would thus be supplied to every branch of the administration, and especially the increase to its ability to take proper measures for anticipating and relieving famine. It may be useful to quote Sir J. Strachey's words on this subject in a recent minute. He begins by referring to a resolution of the Government of India (4th February, 1879) in which the following passage occurred:—

“Bengal especially is a province which is singularly deficient in opportunities for agricultural instruction; while it is, perhaps, of all Indian provinces, the one where a reform of practice is most needed. It is also the province of whose agricultural resources and capacities the governing body knows least. It is a matter of more than ordinary importance that the cultivating and wealthy landowning community in this great province should be taught to realise the advantages of a better agricultural practice, and that steps should be taken to remove the reproach which now exists that the very elements of agricultural information, such as the average yield of particular crops in particular soils, are wholly absent.”

“I will give two instances, both of them of recent date, to illustrate how profound has been the ignorance in Bengal on agricultural matters, and what serious effects on the finances and administrative system of the Government that ignorance has or might have produced.

“The first instance is taken from the Bengal Famine in 1873-74. In that year it was believed that the winter rice-crop of Behar and Northern Bengal was almost completely lost, and that it was the crop on which the population of this part of the province chiefly subsisted. One of the most accurate and accomplished officers in the service prepared, under the orders of the Local Government, from all the materials that he could obtain, an estimate of the area which that crop usually covered. He came to the conclusion (to give one illustration) that in the Saran district, which contains about 2,000,000 people and 2,600 square miles, 50 per cent. of the cultivated area was ordinarily under winter-rice; and the assumption being that nearly the whole of the crop in this great tract of country had perished, it was supposed to follow necessarily that the dense population of the district, which depended mainly on this crop for its support, must suffer severely from famine. In 1875, a special officer, selected expressly for his competency for the task, was deputed by the Bengal Government to make a systematic enquiry into the agricultural resources of the country. His conclusion was that the winter-rice crop in Saran covers only 28 per cent. of the cultivated area, and this is now believed to be a fair approximation to the truth. Thus, the original estimate of the enormous loss in rice, and the estimate on which the relief measures of the Government were based, was in excess of the actual loss by nearly 100 per cent. A similar error occurred in regard to the district of Gya, where the area under winter-rice was estimated at 75 per cent. of the whole cultivated area, whereas, in reality, it was hardly more than 50 per cent.

“But, besides this error as to the area under the winter rice crop, there was another and more important error as to the habits of the mass of the population of Behar. It was believed that the people lived principally on rice, and that if that crop failed they would have little else to fall back upon. But it is now known that the winter-rice crop forms only a small part of their food supply, and that they are mainly fed on the autumn millets and maize and on the spring barley, &c. To this error it was due that the Government deemed it necessary to import rice at enormous expense from Burmah, for the support of a population to which rice was an unusual luxury, and which would have been better fed on of cheaper grains produced in the adjoining parts of

" the North-Western Provinces. The result of these accumulated errors was the mistaken belief that a terrible famine must be impending, and more than 700,000/ was expended, for the most part needlessly, on famine relief in Sâran alone.

" The case of the Sâran district is only given as one among many instances that might be adduced to shew the ignorance of the agricultural resources of the country which existed through Behar and Bengal. It led, in Orissa in 1866, to the refusal of relief to a starving population; it led, in 1874, to the lavishing of relief on a population which (to a large extent at least) not only was not starving, but which was hardly even distressed. I speak within careful limits when I state my deliberate conviction that a knowledge of the cultivated area of the crops, and of the average yield in Bengal, such as that possessed by the Department of Agriculture in the North-Western Provinces, would have saved the State some millions of pounds sterling in 1874.

" My other example will be taken from the scare which again came over Behar in 1875, on which occasion we were only just saved from embarking on a second campaign against an imaginary famine. In November of that year, the Bengal Government estimated that about seventeen millions of people would be affected by scarcity, and eight millions of them severely; that matters were nearly as bad as in 1873; and that it would be necessary to import 300,000 tons of food-grain into the afflicted tracts. Measures were advocated which, if the Government of India had acceded to them, would have involved an expenditure of over half a million in mere anticipation of danger. Further enquiry was, however, ordered; two special officers were deputed to investigate the facts; and after a considerable lapse of time the kernel of truth was ascertained which lay wrapped round by many folds of ignorance and error. It was found that there had been a slight local failure in three sub-divisions only; a few small public works, carried on at a moderate expense, were sufficient to relieve whatever distress existed; and prices even in those remote sub-divisions were cheaper than usual in the very months when famine was expected to be at its height.

" These instances could be abundantly amplified; but I think I have said enough to shew that the remarks made by the Government of India as to the ignorance of the governing body of Bengal concerning the agricultural resources and capacities of the province were fully justified. In a purely agricultural country like India, an intimate knowledge of the conditions of agricultural industry is everywhere essential. Bengal does not possess even the rudiments of that knowledge, nor is it possible that it should possess them so long as it retains the unenviable distinction of being the only one great province in India which has never obtained even a field survey. No doubt there are other respects in which statistical knowledge in Bengal has increased. For example, only a short time before the famine of 1874, not only were there no statistics of agriculture, but there were no statistics of population. According to the census of 1872, Bengal contained 63 millions of people. In 1871, the population was supposed to be about forty millions. I quote from the Bengal Administration Report for 1871-72 the following passage referring to this subject. —

" The result has been almost, it may be said, to revolutionize our ideas both in regard to the amount of the population of these provinces, and relatively in regard to its distribution in different districts, races, and religions; while by shewing that the numbers vastly exceeded any former computation, it has wholly altered our calculations with respect to the incidence of taxation, the consumption of salt, and many other matters.

" There had long been a question of a census of Bengal in connection with a census of all India, but there seemed to be great difficulties in the way. In very old times, when we did not entertain the views in regard to administration which have more recently prevailed, the Government seems to have arrived at a computation which, supposing the population to have increased, as it may have increased in the last two or three generations, may not have been very extravagantly wide of the mark either in the whole or as regards particular districts; but in more recent times, the theory of Government by judicial institutions alone has pre-

" vailed, and there has been loss and less executive interference.

" Partial computations of the population, not without some value, have here and there been made by individual officers in some districts; but, on the other hand, in other districts, mistakes, clerical errors perpetuated without observation, and other causes, have rendered the estimates much more wide of the mark than those of former days; and the official statements have become more and more discrepant. As an illustration of the extreme point to which want of statistical knowledge of the people had reached in these provinces, the following figures are given showing the difference between the population of some important districts as given in grave statistical returns by the authority of Government within the last few years, and stated in the Administration Report of 1870 'according to the latest returns,' and that now ascertained by census: —

	Population according to Return of 1870.	Population according to present census.
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" Nudda (perhaps the 'most cared-for and 'most fully-administered metropolitan district in Bengal)	568,712	1,812,795
" Furreedpore - - -	147,127	1,012,589
" Pubna - - -	337,079	1,211,594
" Cuttack - - -	215,835	1,449,784
" Monghyr - - -	755,389	1,842,986
" Kamroop or Gowhatty	80,861	561,681

" It will be seen that in these cases the population varied from a third to a seventh of that now ascertained."

" Similar results will always happen when popular impressions are submitted to the test of scientific processes. Whether the subject be population, or area, or agriculture, or tenures, or commerce, or other matter of importance, no Government which does not possess statistical knowledge can be said to possess the data on which alone a sound administrative system can be based.

" My present object, however, is not to insist on defects existing in Bengal, but to show * * * the work which has been undertaken in the North-Western Provinces by the Department of Agriculture and Commerce.

" When this Provincial Department was created in 1875, the first duty entrusted to it was the organization of a complete system for the regular and permanent collection of agricultural statistics.

" There had long existed in the North-Western Provinces excellent machinery for the maintenance of village records; it only required thorough and systematic supervision to make it really efficient; but owing to the absence of such supervision its practical value was comparatively small.

" The operations connected with the revision of settlement had brought to light the fact that the admirable village maps, and the statistics concerning tenures, crops, and areas, which had been compiled thirty years before, had not been correctly kept up, so as to show the alterations that had occurred from time to time: no consecutive record had been maintained of the history and circumstances of each village. An immense amount of information, which would have been most valuable in securing at the new settlement the imposition of a fair and equal revenue-demand, was hopelessly lost.

" Mr. Buck's Department undertook the establishment of a system under which the village records would be constantly maintained in accurate accordance with the changing facts of successive years; which would provide a continuous fiscal and agricultural history of every village; which would convert into certainty and equality the uncertainty and inequality of present assessments, and which, when a new settlement of the revenue became necessary, would enable the Government to confine its operations within the narrowest possible limits.

" I believe that a more important work was hardly ever undertaken in India, and no praise can be too high for the ability and zeal with which Mr. Buck has framed and carried out his scheme. Nor is it possible to acknowledge too warmly the strong interest and support which the present Lieutenant-Governor, Sir George Conner, has given to all these arrangements. If his successors and the Government

" of India watch over the work, and allow no interruption in the admirable system which has been established, there will, before many years have passed, be hardly a country in the world which will possess more invaluable stores of knowledge regarding its agricultural state and the condition of its people.

" There will be, for every village, records shewing for each year the area cultivated, irrigated, or fallow; the increase or decrease in the extent of land under the principal crops, and in the area covered with wood; the waste land that has been reclaimed; the methods of irrigation; the number of wells; the rental of each field; the variations from year to year in the amount of rent demanded, collected, and in arrear; the revenue demand and collection; the name of the owner and cultivator or tenant of each field; the status and classification of the tenants; and a multitude of other facts. To say nothing of the constant value of such knowledge, to the public and to the Government in every branch of the ordinary administration, I must again assert that without some such system of agricultural statistics, it will never be possible to contend in a satisfactory way with the calamities of famine, for without them we shall never be able to form, even approximately, any judgment as to the actual produce of each harvest. And I repeat that it was the want of such a system which led to the expenditure in Bengal, in 1874, of millions of money on the relief of a famine, which, although I fully recognise its existence and its severity within a limited area, was, to a great extent, imaginary."

How to provide for the cost of a Field Survey.

4. The main objection to a field survey in Bengal (besides the argument that it is not needed, which has been disposed of already) is the great expense, which ought not to fall on Government. This is an effect of the Permanent Settlement. In other Provinces a field survey is carried on in connection with revision of assessment, and the cost of the work is generally recouped to Government by an increase in the land revenue. Such an increase cannot be looked for in the greater part of Bengal, and therefore the expenditure of Government would not be remunerative, and the cost of the work would fall on the general tax-payer, unless special legislative power is taken to impose it on the landed classes who benefit by it. The reasonableness of such legislation can hardly be doubted, but it might be argued that the amount imposed would prove an intolerable burden. No doubt, in a country where rice is largely grown and the fields are extremely small, a survey which should embrace every field must be very expensive. In the parts of Bengal where a Cadastral Survey has already been executed, namely, Shahabad in Behar, Orissa, and a part of Chota Nagpore, the average area of a field has been found to be between $\frac{1}{2}$ and $\frac{3}{4}$ of an acre, and the total cost of the survey has been from 8 to 10 annas per acre, or about Rupees 350 per square mile all round, besides the cost of demarcating field and other boundaries, which would probably amount to Rupees 50 in addition, making a total cost of Rupees 400 per square mile. Taking the area of Bengal (after deducting the hill tracts and the temporarily settled districts in Orissa and Chota Nagpore) at 120,000 square miles, the total cost would be 4½ million sterling, which would certainly be a very heavy sum to raise by special taxation. But it may be doubted if it would be wise to adopt such a "counsel of perfection" as that of surveying and plotting out every individual field, however small in size, if the result would be to incur an expense which is almost prohibitive. In Bombay it is found sufficient to survey the land in blocks of from 40 to 45 acres, a rough record being made by a separate agency of the interior particulars as to the actual fields and holdings; and this system is found to afford sufficient detail for the complete protection of individual right and the record of agricultural facts. Similarly in Bengal it might perhaps be sufficient to survey in blocks of from 1 to 2 acres, leaving the interior detail and record to be filled up by less scientific and rougher hands. Such a result would no doubt be less complete and less satisfactory than that obtained by the ordinary procedure of a Cadastral Survey, and it can only be recommended as a compromise if the cost of the other is found to be too great, and as better than no survey at all. The cost of the Cadastral Survey in the North-Western Provinces where the fields average from 1 to 2 acres has been Rupees 165 per square mile; and a survey for Bengal in blocks of similar size, adding in the expenditure on

demarcation of village boundaries and subsequent interior record, would probably not exceed Rupees 200 per square mile, or a total charge of Rupees 2,42,00,000 or say 2½ millions sterling. Of this sum it is perhaps fair that the Government, i. e., the general tax-payer, should bear a part. The surveying and mapping of the whole of India for topographical and revenue purposes, including the work of designating the village boundaries, is one of the duties of a civilised Government, which has to be paid for out of the general revenues of the State; it has already been done for the most part, but some of the surveys carried out in the earlier days have been found to be imperfect and at the present time a revision of this work is going on in the North-Western Provinces. Bengal has borne its share in the cost of surveying other parts of India, and though the position of Bengal is exceptional as being the Province in India which pays by far the smallest share towards the Land Revenue, still it may reasonably be argued that other parts should bear their share in Bengal; in other words, the cost of a revenue and topographical survey should be defrayed out of Imperial taxation. In the permanently settled districts of the North-Western Provinces where a Cadastral Survey is now being carried out, the Government of India has agreed to bear a portion of the expense corresponding to that which would be incurred by a Revenue Survey, or Rupees 53 per square mile, leaving the remainder to be met by a local cess; and the same precedent would seem to be applicable to Bengal. The balance therefore or Rupees 147 per square mile, or Rupees 1,76,00,000 for the entire area of 120,000 square miles would remain to be imposed on the landed classes by a special and temporary taxation. The gross rental of the Province (excluding Orissa and the temporarily settled districts) is about 12½ millions sterling, so that the cost of survey to be defrayed is about 14 per cent. on the rental of a single year. If spread over fourteen years (and it would probably take that time to complete the entire survey), the tax would only amount to a cess of 1 per cent. on the annual rental, a sum which would not be severely felt and which would be amply repaid to the people by the security which would be given to their rights and interests in the land by such a record.

Creation of a new body of Village Accountants in Bengal.

5. The survey record having once been prepared, it is essential that it should not fall into neglect, but that annual changes in the area, the cultivation, the crop, the tenant, the rent, &c., should be recorded, and for this purpose a body of village accountants, such as exists in every other part of India, and as did exist originally in Bengal, must be organised. In Behar and Orissa the institution had not fallen so utterly into desuetude as elsewhere, and was revived by Sir G. Campbell in 1873, and these officers have since then been working, it is understood, as well as was possible considering the imperfect materials they had to deal with. The Famine Commission urge the complete organisation, education, and disciplining of these accountants where they still exist, and the creation of a new body of accountants where the original holders of the office have entirely disappeared.

Second step: the appointment of a Supervising Staff.

6. The second item in the reform of agricultural statistics is to have a staff of active subordinate officers employed in keeping the village accountants to their duty, inspecting their work, visiting the villages in turn, and checking the accuracy of all the items recorded concerning it. In the greater part of the North-Western Provinces, such an establishment has already been created; and it exists in a less complete form which may need some expansion in the Punjab, in Bihar, and in Madras. Elsewhere it would have to be created; and no better system can be suggested to the other provinces for an example than that of the North-Western Provinces in which the instructions for the guidance of these officials have been laid down in the fullest detail. The cost of this supervising staff, as of the village accountants, might be met by a cess upon the land. It need hardly be added that in Madras and Bombay their supervision should extend to the *manu* villages and the estates of talukdars and zemindars, as well as to the Government ryotwari villages.

Interprovincial Trade Statistics.

7. Besides the agricultural statistics kept up by the village accountants and the supervisors, it is necessary to establish a system of interprovincial trade statistics, by which a record may be kept of the export and

import of the principal articles of production and consumption. The use that was made in section 2 of such statistics as have been compiled for years in the Punjab and the Central Provinces and for two years only in the North-Western Provinces, shews how valuable a guide they are towards an estimate of the economic condition of the agriculturist. The Famine Commission have learned with regret that the Government of India has lately decided to do away with, instead of enlarging and improving, the establishment that already exists for the collection of these statistics. The argument for this step, that, as far as trade and commerce alone are concerned, the statistics of external and not of internal traffic are chiefly required, and that provincial limits are arbitrary ones based on no geographical boundaries, is no doubt a sound one; but the application of these statistics to agricultural production and to the requirements of the population seems to have been overlooked. It is surely important that a Government should know whether its population raises more rice, wheat, cotton, tobacco, &c., than it consumes, or less, yet there is no method by which this can be learnt except by that of frontier registration. It may be hoped that the Government of India will, on a reconsideration of these arguments, be ready to revise its decision and to sanction a scheme for registering the exports and imports of all the most important articles of trade which cross the boundaries of a province or presidency on the main lines of communication. The scheme need not be an expensive one. The chief traffic is yearly getting more and more concentrated on the railways; it is now registered in a very cheap and efficient way by a method devised by Messrs. Buck and O'Connor (the orders of the Government of India have not affected this) on the East Indian Railway and Oudh and Rohilkhand Railway, and the same method might be applied to other railways. The coasting trade also is registered. River traffic only exists to any great extent between the North-Western Provinces and Bengal, and between the Punjab and Sind, a single registering station in the Ganges and another on the Indus would suffice. Traffic by bullock carts and pack-bullock passes no doubt along numerous lines, but here the rule of "*de minimis*" would apply, and it would be sufficient to select the few very important arterial lines and to establish registering posts on them. The control of these posts and the compilation of the returns they send in, would be naturally one of the duties of the Agricultural Department.

Third step: creation of an Agricultural Department in each Province

8. Having provided thus for the annual rendition of a set of agricultural statistics based on accurate survey and field records and constantly tested and checked by a special staff, and for returns of the main imports and exports of each Province, it is necessary to provide in the third place for the existence of an officer or a set of officers who shall be charged with the duty of compiling and collecting these statistics, extracting from them the information most important for the purposes of administration, and laying it before the Government and the public in an intelligible form. In the attainment of this end, the Famine Commission recommend the creation of an Agricultural Department, such as was established in the North-Western Provinces in 1874-75, a specially competent officer being placed at the head. In the want of such an officer, the North-Western Provinces presented till 1875 (and the Bombay Presidency, in some degree, still presents) the melancholy spectacle of a country where detailed information of vast importance is painfully collected from innumerable sources, and is then laboriously thrown aside and made no use of. In the Punjab, under the Settlement and Financial Commissioners, a far more intelligent use is made of the annual village-papers, but still the Punjab Government recognises the importance of an Agricultural Department on the model of the North-Western Provinces, and asks for its introduction. In the Central Provinces and in Madras great attention has been paid by the Chief Commissioner and by the Board of Revenue to agricultural statistics, but the facts compiled in the preceding section, while they testify to the progress that has been made, at the same time illustrate the room that remains for further improvement.

Part to be taken by such a Department in Famine Relief.

9 The bearing which the Famine Commission's recommendation on this subject would have on the

question of famine administration is extremely obvious.* It is in the power of Government to secure the most absolutely accurate information as to the area of land cultivated every year, and the crops it is sown with; and there is no reason why, in the course of time, it should be impossible to obtain as accurate knowledge regarding the prospects and outcome of the crop as is possessed, for instance, in England. But to effect this requires the continuous and concentrated attention of an expert, or a body of experts, such as only the institution of an Agricultural Department can provide. At present there is much uncertainty as to the amount of the average yield of different crops, the remarks in the second section have both shown this and have also laid down the limits within which the uncertainty exists; and the more these limits are defined and made clear the less room for uncertainty will remain. If the average area and the average amount consumed and exported or imported are positively known, the average production is merely a matter of arithmetical calculation. Steady and prolonged enquiry into these points will undoubtedly result in eliminating almost all elements of uncertainty. Having thus obtained a standard of average production, it will be easier for the officers of the Agricultural Department and for all district officers to give a sound estimate of the relation which the actual crop of each harvest bears to an average crop. Mistakes will be made at first, but in years of ordinary fluctuation the range of prices subsequent to the harvest will be the best test of the accuracy of the estimate formed of that harvest, and by degrees the estimate will be able to bear that test; and the continuous record of outcome year by year ought to suffice to shew the condition of the agricultural population, whether they have been depressed by successive years of adversity, or the reverse; and this is an important element in judging of their capacity to resist a famine. When a disastrous drought occurs, the body of officers thus trained would be able to estimate the extent of loss and to form a forecast of coming distress totally different in its weight and value from the haphazard guesses now made whenever a forecast has to be framed.

Reasonableness of the Scheme.

10. In England, where the detailed statistics of crop area are supplied by purely voluntary arrangements, it is found possible for an agricultural expert to travel through the country and inspect the standing corn and to say—"the food requirements are 30 million quarters; the harvest will produce 16 million quarters and a balance of 14 million quarters must be imported." And the trading community at large accept his forecast and base on it their orders to purchase; and the experience of years has proved the general correctness of his estimate. There is no reason why a similar result should not be attained in any province of India; why the head of the Agricultural Department should not be able to say "the crop this year will amount to so many tons, and as last year's crop was a good one and food-stocks were not depleted, there will probably be so much for export," or "the year's crop falls below the requirements of the province by so much and therefore it will be necessary for private trade to import the deficient quantity." Besides its usefulness as a guide to traders, such information would be invaluable, not only for purposes of famine relief, but also for those of general administration, it would afford a basis for conclusions as to the reasonableness of the assessment of land revenue, and the fiscal history of each village would be on record against the time of resettlement; it would lead the attention of Government to the case of those parts of the country which like Jhansi or the Deccan districts are suffering either from the barrenness of the soil, or the improvident character of the people, and would thus prevent the misery that ensues if Government only awakes to the distress of the people at a time when matters have gone too far to be remedied.

Special Officers in each District under the Agricultural Department.

11. The Agricultural Department, as proposed by the Famine Commission, would consist of a secretary, who

* Besides superintending agricultural and trade statistics, the Agricultural Department in the North-Western Provinces has other duties, which are laid down in Sir J. Strachey's minute, and which relate principally to the introduction of improvements in field implements and of new staples. These matters would be attended to by the Department in other Provinces, and they are only not referred to here because it is wished to concentrate attention on the main topic of the share this Department should take in warning the Government of the approach of famine.

would remain with the Government and be its mouth-piece, director or executive head of the department, having under him a body of subordinate officials. There should be a special officer of the rank of a deputy collector in each district, who would (besides looking after the village accountants and their supervising staff and the trade registers) be engaged in the same kind of work as that which the head of the department would perform for the whole province or presidency: he would work out the same calculation as to the population of the district and their ordinary consumption and requirements, would ascertain as far as possible how the balance of trade in the chief articles of production and consumption lies as regards that district, and would deduce therefrom an estimate of the average outturn and rate of production within the district. He would learn by continuous application of his mind to this main subject, to judge the prospects of each crop and the relation of the actual to the average harvest, and would thus be the eye of the head of the department, whose forecast in time of drought, when based on the reports sent up to him by a trained observer in each district and assisted by his own observation and enquiry, would be more valuable and trustworthy than when based on his own experience alone.

Usefulness of such Officers for other Purposes.

13. Nor is this the only way in which such a body of officers would assist the Government in preparing for a campaign against famine: they would form the permanent nucleus of a system of village inspection, and would be perpetually employed in collecting the information which is so much needed by Government in carrying out measures of relief. They would learn more about the condition of classes—who are prosperous and who depressed, what the causes of depression are, and what are the number and the location of the classes who would be the first to succumb under the pressure of scarcity and high prices. They would stimulate the landed classes to apply for advances for the improvement of their land, and would watch over the outlay and the repayment of such advances. They would be specially utilised in making the enquiries which would lead in times of distress to the suspension of the land revenue. They might be specially employed in sanitary enquiries and might be put in charge of the vital statistics, busying themselves both in improving the correctness of the registration and in investigating the causes of any phenomena which that registration brings to light. The extent of the food-stocks, the ebb and flow of local trade, the course of prices, the current rates of interest charged on loans to different classes, the customary wages paid for different kinds of labor, the deficient or superabundant supply of any kind of labor,—these and other subjects

akin to these, on all of which our information is at present far from being full and precise, might come within the scope of their enquiries.

Cost of the Establishment.

13. The cost of such an establishment would undoubtedly be considerable. The mere pay of a deputy collector on Rs. 250 a month for 17½ principal districts would be Rs. 522,000 a year and if they are on two or three grades to allow for promotion and reward, the cost, including travelling charges and establishment, would hardly fall short of 10 lakhs of rupees. This would cost each Province or Presidency from 1½ to 2 lakhs of rupees a year, and would probably have to be met from Provincial Resources. Besides this, it may be reasonably doubted whether 17½ officers of such calibre and special aptitudes could be found at once; and nothing would be more fatal than to start such an experiment with men of the class of the average native official who have been trained to perform certain definite duties, but have as a rule little originality or independent habits of thought. The Commission would, therefore, probably not advocate the appointment of the full complement of officers at once, but would rather that Government should proceed experimentally, and that appointments to these posts should be made as fit men are found, the experiment being first tried in the districts where there is most fear of famine occurring, such as Behar and Orissa in Bengal, the trans-Jamna and Rohilkhand districts in the North-Western Provinces, the Delhi and Sirsa divisions in the Panjab, the Deccan districts in Bombay, the Ceded Districts in Madras, &c. If the anticipations formed as to the usefulness of such appointments are realised there, the system could be extended to other parts as suitable and trained officers grow up to fill the posts. Or, again, instead of appointing a Native Officer to each District, it might be more useful to appoint an English Officer of the Government Civil Service to each Division, and especially so if any are sent out after receiving a scientific training at the Cirencester or any other Agricultural College. This class of officers would at first be more useful to the Head of the Department than a Native Deputy Collector, as being better trained to combine and compile information and to draw just conclusions, but there may well be room for appointing officers of both classes.

14. The duties of the Director of Agriculture in each province would be to supervise these special District Officers, and to act as the adviser of the Local Government, through the secretary in charge of the Department. But on this subject there is nothing to add to what has already been said in Para. 125 of the Report, Part I.

C. A. E.—27.9.79.

NOTE ON CROP EXPERIMENTS IN THE BOMBAY PRESIDENCY, BY MR. J. B. PELL.

Crop experiments are intended to serve the double purpose of assisting to arrive at a conclusion regarding the average produce of different classes of land, with a view to forming an estimate of the gross production of a district, and of supplying facts which will enable us to guess at the proportion the assessment on various soils bears to the productive powers of those soils. From a multitude of experiments conducted during three years in the Bombay Presidency, a fairly numerous selection has been made of those relating to bajri, ragi, jowari, wheat, and rice.

A review of the papers brings one to the conclusion, at which nearly every officer concerned in their preparation arrived, that the experiments are conducted on too petty a scale to be a safe foundation for theories. But they are not altogether useless.

The first thing—more striking than anything else—to be learnt, is the amazing differences in the outturn of dry land, compared with the comparative uniformity in the return from wet. Take bajri. The season of 1872-73 is favourable, and there is an average outturn of 378 lbs. per acre. The next year is not so good, and the outturn averages 331 lbs.; but the individual experiments range from 112 lbs. to 790 lbs. Now look at another of the great food-supplying crops, jowari. The favourable season of 1872-73 gives about 1,000 lbs. to the acre; but next year the failure is almost complete, and 1874-75 is, if anything, worse.

The next point is, the tendency of Government officers is rather to dwell upon the returns of the good years, and to pass over the bad years as if quite exceptional and abnormal. But in estimating the produce of a country, it would seem safe to take 3rd of a favourable season's crop for the average crop on the poorer soils, and to allow for at least one of the main sowings failing annually on all dry soils. And this, too, as regards assessment. Many a ryot between 1873 and 1875 must have left the village bania to pay the assessment, and must have borrowed grain to live on besides. And these figures thus give a peep of village life, and show how essential it is that, whether assessment is high or low, some one with capital (Government or the bania) must annually, somewhere or other, step in to retain the smaller ryot where he is. We see, too, how the extension of cultivation, accompanied by some increase of population, may have had its share in adding to indebtedness. These figures show how the possession of the poorer lands calls for capital, or we should say, perhaps, necessitates borrowing. The bumper crop will pay the man who is prudent and has a little capital or credit. As long as a population was settled on the best lands, the people were more independent; now they have spread themselves over all lands, they lean more on the bania.

The first conclusion, therefore, from the experiments, is caution before accepting the outturn of good years,

either as a measure for gross average production, or as a proof of the ability of ryots to pay an assessment. The next is that it is the poorer lands and smaller ryots, that we have to be anxious about and that require protection. It is these lands and ryots who are passing to the banias, and these figures show us how. Because of the assessment? Not altogether—for a man must borrow to live. One last remark. The best outturn on poor soils is, of course, from fields that have been well-manured. But it seems scarcely fair to accept these yields as a proof of a light assessment. It is the

average state of agriculture on these inferior lands that must fix the average yield and must bear the assessment. A field well-manured is like a field with a well in it: each improvement is the result of the ryot's capital, and if he is allowed the well, he should be allowed the extra manure. No settlement officer would defend a high rate on good dry land, because some ryots had introduced water and got large profits. Why should he even mention heavy yields on poor lands very highly manured?

A. W.—1-10-78.

BAJRI.

Season of 1872-73.

District.	Number of Experiments.	Total Area Tested.		Actual Outturn in lbs.		Outturn per Acre in lbs.		Assessment per Acre.	Assessment, New or Old.	Average value of Crop per Acre.	Proportion to Assessment.
				Grain	Straw.	Grain.	Straw.				
Poona - {	3	Acre	A. G.	91.5	179	305	597	Rs. A. P.			
	4	$\frac{3}{10}$	0 12	57.7	227	228	1,136	0 11 0			
Total -	7	$\frac{1}{2}$	0 20	149 2	406	298	812	0 11 5	Old.	10 9 7	14 $\frac{1}{2}$ to 1
Nagar -	3	$\frac{2}{5}$	0 16	143 5	308	358	995	0 10 4	Old.	19 15 8	12 $\frac{1}{2}$ to 1
Nasik - {	3	$\frac{9}{20}$	0 18	163.6	574	363	1,275	0 9 10			
	3	$\frac{9}{20}$	0 9	138 6	213	616	947	0 11 6			
Total -	6	$\frac{27}{20}$	0 27	302.2	787	448	1,166	0 10 8	Old.	11 6 0	17 to 1
Grand Total	16	$\frac{123}{40}$	0 63	594.9	1,591	378	1,010	0 10 10	Old.		

Season of 1873-74.

Nasik - {	6	$\frac{1}{10}$	0 12	75	—	250	—	0 6 11	—	—	—
	3	$\frac{3}{20}$	0 6	74	—	493	—	0 5 8	—	—	—
Total -	9	$\frac{9}{20}$	0 18	149	—	331	—	0 6 4	Old	6 11 6	16 to 1

Season of 1874-75.

Nasik -	1	$\frac{1}{10}$	0 4	8 $\frac{1}{2}$	—	85	—	$\left\{ \begin{array}{l} 0 13 6 \\ 0 11 6 \end{array} \right.$	Old New.	$\left\{ \begin{array}{l} 1 13 0 \\ 1 13 0 \end{array} \right.$	3 to 1
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General Result.

NUMBER OF DISTRICTS	Number of Experiments.	Area tested Acres.	Outturn per Acre in lbs.	
			Grain	Straw.
3	26	2 $\frac{1}{4}$	373	1,010

REMARKS.—The seasons were on the whole good for bajri. In 1872-73, the yield per acre varied from 190 lbs. of grain in the Poona district to 790 lbs in Nasik. In 1874-75, all the experiments were in Nasik, and the yield varied from 518 lbs. to 112 lbs. Only one experiment was made in 1874-75, and it was also in Nasik, and gave only 85 lbs. The experienced survey officer, Mr. Fletcher, said it was the poorest crop he ever saw, but that as every fifth row was "tur," $\frac{1}{5}$ should be added to the value of the produce.

The assessment in the first year's experiments ranged from 6 as. to Rs. . . . 1 3 0
 The assessment in the second year's experiments ranged from 4 as. to Rs. . . . 0 8 9
 The assessment in the third year's experiments was from 0 13 6

It may be noted that according to a result of experiments which appeared in the *Dombay Gazette* in 1872 the average outturn of bajri per acre is 390 lbs

Colonel Francis remarks that the experiments have all been made on medium and poor soils, and therefore do not shew the average yield of a bajri crop in the districts tested, though probably representing the average yield of the class of land experimented upon.

JOWARI

Season of 1872-73.

DISTRICT.	Number of Experiments	Total Area Tested.		Actual Outturn in lbs.		Outturn per Acre in lbs.		Assessment per Acre.	Assessment New or Old	Average value of Crop per Acre.	Proportion of produce value to Assessment.
				Grain.	Straw.	Grain.	Straw.				
Poona -	1	Acres $\frac{1}{10}$	A G. 0 4	51	143	510	1,430	Rs. A P. 1 1 0	—	Rs. A. P. 20 12 0	19 to 1
Sholapore {	7	$\frac{11}{20}$	0 22	327	1,305	594	2,373	0 14 2	—	—	—
	5	$\frac{3}{10}$	0 12	602	2,205	2,008	7,350	0 10 5	—	—	—
Total -	12	$\frac{11}{20}$	0 34	929	3,510	1,093	4,129	0 11 9	—	25 14 4	38 to 1
Grand Total	13	$\frac{19}{20}$	0 38	980	3,653	1,031	3,845	0 11 3	New.	—	—
Dharwar -	3	—	0 30	370	2,804	1,027	3,739	1 0 11	—	36 9 10	36 to 1
Broach - {	1	$\frac{1}{20}$	0 5	178	367	1,424	2,936	4 10 6	—	—	—
	2	$\frac{1}{10}$	0 10	149	380	596	1,520	3 6 9	—	—	—
	4	$\frac{1}{5}$	0 20	458	1,912	916	3,824	5 2 0	—	—	—
	7	$\frac{7}{5}$	0 35	785	2,659	897	3,039	4 6 5	Out in Feb. and Mar. 1873.	30 13 0	7 to 1

Season of 1873-74.

	DISTRICT	Number of Experiments	Total Area tested.	Actual Outturn in lbs.		Outturn per Acre.		Assessment per Acre.	Average value of Crop per Acre.	Proportion to Assessment.	REMARKS.
				Grain.	Straw	Grain	Straw.				
WhiteJowari {	DHARWAR. Nawalgund	2	$\frac{1}{2}$	338	648	676	1,296	1 0 3	Rs. A. P. —	—	Cut March 1874. Linseed besides. Cut January 1874. Linseed besides.
	Nargund -	4	1	212	780	212	780	1 0 8	—	—	
		6	$1\frac{1}{2}$	550	1,428	367	952	1 0 6	15 4 5	15 to 1	
Jowari {	POONA. Bimthari -	3	$\frac{7}{20}$	644	—	370	—	0 8 0	20 6 0	40 to 1	A little Kardi besides. New Assessment.
	SHOLAPORE. Madha -	6	$1\frac{9}{20}$	545	—	376	—	1 1 10	8 10 6	8 to 1	

Season of 1874-75.

Jowari with tur.	DHARWAR. Gadak -	3	$\frac{1}{4}$	0 30	150	588	200	784	0 8 8	1874. Out Dec.	8 11 4	16 to 1
" + tur. and gram.	Karajgi -	3	$\frac{1}{4}$	0 30	100	1,500	133	2,000	1 0 0	" "	7 5 10	7 to 1
Jowari + tur.	Nawalgund	3	$\frac{1}{4}$	0 30	568	3,765	757	5,020	1 8 2	" Nov.	15 12 0	10 to 1
" + tur. and mng.	Nargund -	1	$\frac{1}{4}$	0 10	160	1,016	640	4,064	0 14 10	" Dec.	9 5 4	10 to 1
Jowari + tur	Ron -	1	$\frac{1}{4}$	0 10	28	353	112	1,412	0 12 11	—	3 5 0	4 to 1
	Total -	11	$2\frac{1}{4}$	—	1,066	7,222	366	2,626	0 15 10	—	9 13 3	10 to 1
Jowari {	POONA. Indapur -	1	$\frac{1}{4}$	0 10	60	—	240	—	1 0 0	New Assessment.	5 12 2	5 $\frac{1}{2}$ to 1
	Bhimtadi -	1	$\frac{1}{4}$	0 10	60	—	240	—	0 12 0		5 9 7	5 $\frac{1}{2}$ to 1
	Sirur -	1	$\frac{1}{20}$	0 2	25	—	420	—	0 14 0		10 12 5	12 to 1
	Total -	3	$\frac{11}{20}$	0 22	145	—	264	—	0 14 0	—	7 6 1	8 to 1

Remarks—The results in these experiments are so various that it does not seem worth while to compile them further. The yield in the second set of the 1872-73 tests in Sholapur is raised by some bumper crops, said to be most rare and due to the good season.¹ Otherwise so high an average as 2,000lbs. per acre

would not have been got. The first of the Broach crops is described by Lieutenant-Colonel Prescott, who took the test, as a "splendid" crop. The other tests were mostly of "good" crops.

Of the 1873-74 experiments in Dharwar district, Colonel Anderson says the season in the Nawalgund taluk and Nargund Pethe was unusually bad; frequently the jowari was cut for fodder only. Mr. Andling, Deputy Collector, who took the tests, says, that if the jowari paid expenses it was well: mostly it gave no

¹ The yield in Poona and Sholapur varied from 40lbs. to 2,800lbs. per acre.

grain this year. The Poona tests show equally poorly. One irrigated goanta gave 1,520lbs. per acre; the six dry goantas only produced 160lbs per acre. The season was very bad in Sholapur also.

In 1874-75, Mr. Steward says the jowari crops completely failed in the Karajgi taluk of Dharwar. He chose the best crops he could find. The crop in the Poona taluk is described as "bad."

RAGI.

Season of 1872-73.

DISTRICT.	Number of Experiments.	Area Tested.		Actual Outturn in lbs.		Outturn per Acre in lbs.		Assessment per Acre.	When harvested.	Average value of Crops per Acre.	Proportion to Assessment.
				Grain.	Straw.	Grain.	Straw.				
		Acres.	A. G.					Rs. A. P.		Rs. A. P.	
DHARWAR.											
Bankapur -	2	—	0 20	564	710	1,128	1,420	0 12 3	November 1872.		
Hangal -	2	—	0 20	782	1,008	1,564	2,016	0 5 6			
Kalghatghi -	3	—	0 20	768	1,848	1,536	3,696	0 9 5			
Total -	7	1½	1 20	2,114	3,566	1,409	2,377	0 9 1	—	20 2 1	45 to 1

Season of 1873-74.

Kanara	1	¼	0 10	292	15 head loads	1,168	—	0 8 6	—	27 3 1	78 to 1
	2	¼	0 10	250	1,241	1,000	4,964	0 4 8			
Total -	3	½	0 20	542	—	1,084	—	0 5 7			
DHARWAR.									November 1873.		
Kalghatgi -	2	¼	0 20	840	2,352	1,680	4,704	0 6 3			
Hangal -	3	¼	0 30	614	1,120	819	1,493	0 6 10			
Karajgi -	1	¼	0 10	370	708	1,480	2,832	0 13 0			
Dharwar -	3	¼	0 30	558	—	744	—	0 9 0			
Grand Total	9	2¼	2 10	2,382	4,180	1,058	2,787	0 8 1		20 0 7	39 to 1

Season of 1874-75.

DHARWAR.									November and December 1874.		
Hangal -	3	½	0 25	458	650	733	1,040	0 13 10		8 11 8	10½ to 1

General Result.

DISTRICTS.	Experiments.	Area tested Acres.	Outturn per Acre in lbs.		Average Assessment per Acre	Average value of Crop per Acre.	Proportion of Produce Value to Assessment.
			Grain.	Straw.			
2	22	4½	1,256	2,855	0 8 11	21 5 3	38 to 1

Remarks.—In the seven experiments undertaken in 1872-73, the yield varied from 832lbs. to 2,032lbs. of grain per acre. The former return was from a "fair" crop on soil assessed at 0-15-8. The latter was from an "excellent" crop on land assessed at 6 annas. Both experiments were in the Kalghatgi taluk, where Colonel Anderson says the rainfall was not favourable. The heavy returns from ragi attracted attention: Colonel Anderson writes it is not a risky crop, but requires manure, or fallows. The finest ragi is seen in "Kuar" land; but in good years great returns are obtainable throughout. The Revenue Commissioner points out, however, that in hilly lands fallows are the rule, and this would, as Colonel Anderson admits, raise the proportion the assessment would bear. Mr. Pedder would only take one crop in three years, and this would raise the proportion for dry lands by one-third, or make it 13 to 1, instead of 38 to 1. But this would only be true of ragi grown in Malnad taluks.

In 1873-74, the yield in Hangal is said by Mr. Steward, Second Assistant Collector, to have been affected by a want of rainfall; he therefore calls the outturn "moderate" and "inferior." Mr. Ommaney, Assistant Collector, writes that the Dharwar taluk experiments were on very poor stony red soil; one field had not been manured; the other two were full of grass and weeds. In Karajgi, Mr. Steward says, the test was from exceptionally good land (13 annas assessment), manured; and the whole field generally yields a considerably higher average.

In 1874-75, the outturn is brought down by two of the experiments: one on poor soil, neither manured nor weeded (13½ annas); the other of a spoiled crop owing to heavy rain. In the third experiment, the yield was 1,888lbs. of grain (15 annas assessment). The land was well cared for and annually cropped.

WHEAT.

Season of 1872-3.

DISTRICT.	Number of Experiments	Total Area Tested.		Actual Outturn in lbs.		Outturn per Acre in lbs.		Assessment per Acre.	Assessment, New or Old.	Average value of Crop per Acre	Proportion of value to Assessment.
				Grain	Straw.	Grain.	Straw.				
Nasik - - {	3	Aeres. $\frac{7}{10}$ $\frac{9}{20}$	0 7	96	137	548	783	0 14 0	—	—	—
	3		0 18	206	199	459	442	0 15 8	—	—	—
Total -	6	$\frac{5}{8}$	0 25	302	336	484	537	0 14 10	Old.	22 6 5	24 to 1
Sholapur -	1	$\frac{1}{20}$	0 2	22	145	455	290	0 10 0	New.	15 3 3	24 to 1
Grand Total	7	$\frac{27}{10}$	0 27	325	350	482	518	0 12 5	Mixed.	—	—
Broach - {	1	$\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$	0 5	52	46	432	368	4 0 6	—	—	—
	2		0 10	239	272	944	1,088	3 6 9	—	—	—
	3		0 15	215	318	573	818	5 0 4	—	—	—
Total -	6	$\frac{3}{4}$	0 30	505	636	673	848	4 2 5	—	20 9 9	7 to 1

Season of 1873-4.

DHARWAR DISTRICT.											
Hubli - -	1	$\frac{1}{4}$	0 10	59	—	236	—	1 3 0	—	Sown with 168 lbs. per acre of Kusumbha (safflower), cut February 1874. January 1874. " 1874. February 1874.	
Nawalgund -	3	$\frac{3}{10}$	0 30	164	140	219	187	0 14 4	—		
Nargund -	3	$\frac{2}{10}$	0 30	114	105	152	140	1 1 0	—		
Ron - -	2	$\frac{1}{2}$	0 20	196	225	392	450	0 15 6	—		
Total -	9	$2\frac{1}{4}$	2 10	533	470	237	209	0 12 6	—		
Nasik {	9	$\frac{5}{20}$	0 18	171	—	380	—	0 9 4	Old Assessment.		
	4	$\frac{17}{10}$	0 37	532	—	575	—	1 3 3	New Assessment.		
	3	$\frac{3}{2}$	0 15	329	—	877	—	0 15 4	Old Assessment.		
	3	$\frac{3}{2}$	0 15	169	—	445	—	0 14 4	"		
	4	$\frac{7}{10}$	0 14	447	—	1,277	—	1 0 3	"		
Total -	23	$2\frac{13}{10}$	2 19	1,646	—	665	—	0 15 0		Average value = Rs. 18	19 to 1

Remarks.—The returns here vary considerably. The season in the Dharwar taluks was a very bad one.

RICE.

Season of 1872-73.

SOUTHERN DIVISION.

DISTRICT	Number of Experiments	Total Area tested.	Outturn per Acre in lbs.		Assessment per Acre.
			Grain.	Straw.	
DISTRICT OF DHARWAR.					
Bankapur	5	A. G. 7 5	2,823	2,529	1 15 8
Kalghatghi	4	1 0	2,734	2,552	1 8 6
	4	1 0	2,020	2,380	3 6 5
	3	0 30	1,577	2,852	3 10 8
Total	11	2 30	2,188	2,623	3 0 6
Hongal	5	1 10	2,745	2,217	2 0 11
Grand Total	21	5 5	2,463	2,503	2 5 7

Season of 1874-75.

	DISTRICT.	Number of Experiments.	Area tested Acre.		Outturn per Acre in lbs.		Assessment per Acre	
					Gram.	Straw.		
	KANARA DISTRICT		Acre.					
	Yellapur taluk -	5	1	1 0	2,282	2,974	2 5 3	Above ghâts.
	Supa taluk -	4	$\frac{2}{10}$	0 14	2,177	1,146	3 7 9	" "
	Karwar taluk -	1	$\frac{1}{4}$	0 10	2,836	3,612	5 4 0	Below " (sull.)
	Kumpta taluk -	1	$\frac{1}{4}$	0 10	1,024	—	2 7 0	Unsurveyed.
	Kumpta taluk -	5	$\frac{2}{10}$	0 38	2,173	3,177	6 4 11	New survey rate.
	Total -	16	$2\frac{4}{5}$	2 32	2,154	2,980	4 0 2	
	Karwar -	2	$\frac{1}{2}$	0 20	2,064	—	5 4 0	Second or hot weather crop.
	KANARA DISTRICT.							
Rice (red) -	Kumpta -	4	1	1 0	2,240	—	4 9 6	A second crop could be grown on half the land.
Black rice -	Sirsi -	1	$\frac{1}{4}$	0 10	1,120	—	2 1 0	
Waltige rice -	Sirsi -	3	$\frac{1}{4}$	0 20	2,760	—	3 5 0	
Rice -	Supa -	4	$\frac{1}{2}$	0 20	2,040	3,398	2 5 10	
	Mundgod -	4	$\frac{1}{2}$	0 20	2,424	4,562	2 11 11	
	Total -	16	$2\frac{4}{5}$	2 30	2,230	—	3 0 5	All cut in October and November.
	DHARWAR DISTRICT							
Rice -	Kalghatgi -	2	$\frac{1}{4}$	—	2,540	4,592	3 2 0	Irrigated, Nov. 1873.
		3	$\frac{1}{4}$	—	763	1,979	2 10 8	Dry; "
" (Moal Bhât) -		1	$\frac{1}{4}$	—	2,176	4,512	1 4 0	November 1873. "
" (Dod Bhât) -	Hangal -	2	$\frac{1}{4}$	—	3,268	4,792	1 5 0	" "
" " -		2	$\frac{1}{4}$	—	824	2,280	0 13 3	" "
" " -		5	$1\frac{1}{4}$	—	1,491	183	3 7 5	" "
" (Hakal sali) -	Dharwar -	1	$\frac{1}{4}$	—	960	60	1 11 0	" "
	Total -	16	$3\frac{1}{5}$	—	1,558	2,096	2 0 9	

A. W.—1-10-78.

NOTE ON CROP EXPERIMENTS IN THE BOMBAY PRESIDENCY, BY MR. J. B. PELLE.

There are crop experiment papers up to 1875-6 inclusive. Some are published and others passing through the press. The experiments are to be continued. It does not appear that any fresh instructions have been issued about them.

2. But I am not sure how the experiments are to be made more practical by the selection of real exemplar fields. The instructions to be found in the papers appear to have been followed, and the experiments have been applied to fields of all qualities, and conducted with care. The criticism generally applied to them is that the tests should be taken on larger areas. But I think this would occasion additional risk of error or fraud. A large number of the experiments were on a quarter of an acre each. If the classification (*i.e.* soil quality) of this area is noted as has been often proposed, and the history of the crop ascertained, it does not seem impossible to infer correctly the relativity of the test area and its produce to the surrounding land and its produce. Many of the necessary details are given in the statements.

3. The experiments have taken every kind of land—wet and dry, rice land, rich juâr land, light bâjra land, land paying Rs. 3, 4, or 5 an acre in Guzerat, and land paying from 4 annas an acre upwards in the Deccan; land that has had too much rain, land that has had too little, and land that has had the right amount at the right time; land well cultivated and land neglected; land manured and land not manured; and these conditions are noted to help our conclusions.

4. There are so many variable elements in the calculation that there is no such thing as an average field. The assessments are believed to show the quality of the soil and should be a guide to the produce, other factors being constant, but who can calculate how the chances of the season will affect it? And the amount of industry and enterprise of the cultivator everywhere varies.

5. A very large number of experiments with the conditions as varied as possible, and all the conditions carefully noted, continued over a long series of seasons,

is likely to afford the best means of judging what the facts about production are; and the average rate of production can only be an inference formed with very great caution from a careful comparison of the results.

6. I think the experiments on about the present areas should be continued from year to year in each district and on all the principal crops, so that, with an accurate record of rainfall, time of sowing and reaping, &c., the relation of season to produce may be reduced to something like certainty by a wide induction.

7. Meanwhile the papers before us seem full of valuable information. The average and maximum produce are most important, for of course we know that land often returns little or nothing, but we do not yet know what is the maximum capacity of production of each kind of cultivation. When we know in what proportion of seasons, in what districts, and with what constancy the higher rates are obtained, we shall be better able to arrive at an average of the returns to cultivation.

8. As it is, we may learn a good deal. For instance, in the papers of 1873, we see that in an exceptionally good season at Karnula (Sholapur) land assessed under a rupee an acre gave a better return of juâr than any return given of the land in Broach assessed at Rs. 4, 5, or 6 per acre.

9. The question arises whether the high rates in Broach are not too heavy as compared with the low rates of the Deccan; and the answer supplied to the question in these papers seem to be that the rate of production in Broach is not only higher but more even, than in the Deccan (dry crop) undergoing extreme fluctuations.

In the same way the produce of irrigated land where the supply of water is constant, is evenly high.

The average assumed for dry crop produce in the Deccan must obviously be placed low.

Again the production of rice land in the Concan and above them near the ghâts is surprisingly large. Here also the rainfall is great and fairly regular.

10. The effect of careful cultivation is thus noted.—

	seers
On one-fourth of an acre, rice return to	
good cultivation - - - - -	367
Slovenly cultivation - - - - -	290
Return on one-eighth of acre; rice, good	
cultivation - - - - -	233
Slovenly cultivation - - - - -	106
Return on one-fourth acre; rice, good	
cultivation—with manure - - - - -	379
Middling—no manure - - - - -	132
Bad - - - - -	52

In the first and second of these instances the quality of the slovenly land (judged by assessment) was better than that of the well cultivated land. So much for thrift. In the third instance, the quality of the "good" and "middling" is the same.

The produce in Nawalgund in 1873-74, a bad year, may be compared with that in 1874-75, an average year.

11 Mr. Wingate says of the produce of jowari:—"The favourable season of 1872-73 gives about 1,000 lbs. to the acre; but next year the failure is almost complete, and 1874-75 is, if anything, worse." And he infers that the failure was such as to drive the ryot to borrow money to pay his assessment.

Turning to his table, I see that the rates of production quoted are—

1873-74	-	-	676, 212, 370, 376 lbs. per acre.
			Average 408½
1874-75	-	-	200, 133, 757, 640, 112, 240, 240, 420 lbs. per acre.
			Average 342½.

I see the average produce assumed for jowari in the Central Provinces is in various districts, 300, 302, 322, 364, 400, 406, 435, 467, 480, 500, 582, 716 lbs. per acre. So that there, 408 or 342 lbs. would be called an average rather than a complete failure. No doubt, however, the 1,000 lbs. rate is exceptional for the Deccan, and an average above 500 lbs. would not be safe.

12 In working out the problem of a ryot's transactions on the assumed average Deccan holding of 40 acres, with the average number of persons at six acres per head. I took 400 lbs. per acre as his produce, and showed that with grain at 40 lbs. per rupee he had a handsome surplus, after paying assessment and other charges, for optional expenditure.

13. The action of prices on this question must not be overlooked; of course the ryot buys no grain and only

sells his surplus, after providing food. If the crop is short, his loss is partly made up by the higher price.

14 Another line of enquiry suggested by these papers is as to the effect of the size of holdings. The average is stated to be—

Guzerat	-	-	-	-	3½ to 14 acres.
Deccan	-	-	-	-	30 to 53 "
S M C.	-	-	-	-	25 to 36 "
Concan	-	-	-	-	10 to 12 "

The number of people per house is given by the census—

Guzerat	-	-	-	-	3 65
Deccan	-	-	-	-	5 43
Concan	-	-	-	-	5 73

The pressure of population is—

Guzerat	-	-	-	-	278 77 per square mile.
Concan	-	-	-	-	240 10 "
Deccan	-	-	-	-	146 97 "

It is 501 in Kaira and 382 in Surat; but only 90 in Nasick and 101 in Khandeish.

15 Mr. Pedder has some useful remarks on this point in the papers before us. The higher cultivation and greater production of valuable produce in Guzerat (sugar-cane, tobacco, oilseeds, &c.) supports a pressure of population quite double that in the Deccan and in better condition. The soil of Sholapur or Poona could not support double its present population without a far higher cultivation than exists or perhaps than the soil will bear.

16. The Concan appears able to support a large population by the application of thrift to the cultivation of small rice plots with a constant rainfall and large return. Mr Barvé describes the Concanis as parsimonious, careful, and enterprising, as contrasted with the Deccan ryot, who is extravagant, improvident, sluggish. He finds the cause in the necessity for steady industry in the Concan, while the Deccan black soil with less labour gives large returns. It should be added that the caprice of the seasons in the Deccan is unfavourable to steady industry.

16. The great influence of evenness of return for labour on the character of the cultivators is one of the chief points suggested by these papers. The necessity for steady maintained industry is of course a stimulus to intelligent and thrifty agriculture, and is a preferable condition to that when there is sometimes a large surplus, which is absorbed by the sahukar, and sometimes a deficit which adds to the ryot's debt.

12-11-78.

J. B. P.

AREA, POPULATION, CULTIVATION, AND REVENUES OF NATIVE STATES, WITH REMARKS AS TO THE SYSTEM OF ASSESSING THE LAND REVENUE, AND ON THE INCIDENCE OF TAXATION AS COMPARED WITH THAT IN BRITISH TERRITORY.

RAJPUTANA.

The information available on the above subject as regards Rajputana is not so complete as it might be, and the figures being mostly only approximate, are very conflicting in several cases. The total area of all the States in Rajputana cannot be stated accurately, as surveys have not been carried out as yet in all the territories. And of the population correct statistics are not available, no proper census having been taken; all that has been done¹ is to calculate approximately the number of people in each of the States "mainly upon the basis of counting the villages and obtaining a fair average of the number inhabiting an ordinary village."

I.—BIKANIR

Beginning from the north-west corner, the Bikanir State is said in the Rajputana Gazetteer to have an area of 22 340² square miles, and a population of 350,000 souls,³ while Mr. Martelli, Assistant Agent to the Governor-General, in his answers to the Famine Commission, says its area is 17,636 square miles, and its population 539,000, and that the information given in his answers is derived from the Durbar records.

¹ Rajputana Gazetteer of 1879, p. 81.

² Pages 1 and 179.

³ Page 83, but p. 193 gives it as 300,000, according to the State returns.

The annual revenues of the State are given in the Gazetteer as Rs 10,58,554,¹ with the caution that the "figures must be taken as at best approximate." Of this sum, Rs. 1,85,997 are said to represent the land-revenue, and Rs 2,34,975 (given under the head of "other sources") include the proceeds from the sale of land, from unclaimed property, from Mint and from adoption fees.

In the khulsa villages the assessment is made yearly² by the revenue officer at his own discretion. There are two modes of assessment—one called hali, in which collections are made in cash and kind; and the other called pusaita, in which cash payment alone is made. The cash rate per hali or plough is generally Rs. 2; the collections in kind (grain) vary from one-fourth to one-eighth of the produce. Cultivators³ sometimes take leases from the village proprietors on annual rent. It is considered unjust to evict a cultivator before the succession of crops is complete. The rents charged by the Thakurs are realised from the cultivators in various ways; sometimes a third of the crop is taken, and sometimes a fixed charge is levied on a household. Ten rupees for 70 to 80 bighas⁴ is a common rent for

¹ Page 186.

² Rajputana Gazetteer, p. 188.

³ *Ibid*, p. 189.

⁴ Bigha—70 cubits square, i.e., about 8 annas an acre.

hanyas to charge when they hold villages in farm, while smaller proprietors often take but one-fourth. The revenue rates in fiscal villages are Rs. 10 per 100 bighas from Jats, and somewhat less from Brahmins, Rajputs, and other favoured castes, a portion of the crop being usually taken in kind over and above the money rating.

The above rates are for the autumn crop, which is the only crop over much the greater part of Bikanir. In the few tracts which give a spring crop the rents are paid in kind, the proportion being from one-fourth to one-seventh. These rates are supplemented¹ by irregular additions when good harvests enable the villagers to pay more.

No statistics can be given of the average area under cultivation. The land under cultivation varies according to the number of population in each district and their means.²

II.—JESALMIR. III.—JODHPUR.

The Jesalmir State comprises an approximate area of 16,447 square miles, and has a population of 72,000.³

The area of Jodhpur or Marwar is stated in the Rajputana Gazetteer⁴ to be 37,000 square miles, and its population to number 2,000,000; but Captain Barr, in his replies⁵ to the Famine Commission's inquiries, gives the figures as 35,000 and 2,850,000 respectively.

The revenue of Jesalmir is said to be one lakh, and that of Marwar is not stated.⁶

There is no regular assessment of the land,⁷ nor has the revenue been settled for any term of years in any portion of these States on fixed principles such as pertain to land settlements in British territory and in some Native States. The general principle of collection of land revenue in Marwar and Jesalmir is a deduction from the produce in kind at harvest time. This collection varies in different districts according to custom. The largest payment in kind known is half of the actual produce; the smallest is one-eighth; the ordinary collection is one-fourth.

There are no statistics available regarding the areas under cultivation in these two States⁸ (Jesalmir and Jodhpur), "but from enquiries instituted by the Durbar it is calculated that about three-eighths of the populated area of Marwar or Jodhpur is brought under cultivation. In Jesalmir the cultivated area is very considerably less. It is probable that not more than one-twentieth part of the land is cultivated; and from these calculations must be excluded the purely desert tracts of both States, where there is neither cultivation nor population."

IV.—KISHENGARH.

Regarding the Kishengarh State no information can be derived, except that its estimated area is 817 square miles, and that it has a population of 105,000.⁹

V.—SIROHI.

Of the Sirohi State, the area is estimated to be 2,057 square miles, and the population is said to be 153,000.¹⁰ The revenue of the State is derived mainly from land supplemented by the customs, and is partly in kind.¹¹ It amounted to Rs. 1,50,939 in the year ending July 1877,¹² which was an unfavourable year, owing to the failure of the early crops and the enhanced prices of grass and food.

VI.—UDAIPUR.

We come next to the Udaipur or Meywar State,¹³ with its estimated area of 13,674 square miles, its population of 1,161,400, and its "large revenue."¹⁴ But here also the figures are approximations, no census¹⁵ having ever been taken, and no survey made.¹⁶ Regarding the

"large revenue" spoken of no figures are given. The services of Mr. W. H. Smith, c.s., Settlement Officer, Agra, were engaged¹ by the Durbar to investigate and report on land and revenue questions in view to the carrying out of settlement operations. The following is an abstract of the information contained in his report² so far as it concerns this note. Mr. Smith mentions that in Aitchison's Treaties³ the total area of the Udaipur State is said to be 11,614 square miles, but that Colonel Impey states that the area given by the Surveyor General of India, as obtained from the best available maps, and carefully checked by scale and compass measurements, is 12,670 square miles. And Mr. Smith thinks that the latter figure is the more correct. Regarding the population he says the figure "given in Aitchison's Treaties⁴ is 1,161,400; and this "was clearly a guess of 100 per square mile, on the "supposed total area of 11,614 square miles. The result "of Colonel Hutchinson's carefully prepared returns of "1868 was the number 1,131,700; and this Colonel "Impey thinks should be accepted. In the total area, "therefore, of 12,670 square miles, the density will be "89 only to the mile."

Mr. Smith would rate the productive capability of the mass of the soil of Meywar very highly,⁵ but immense areas of magnificent soil are lying waste, and no statistics of cultivation are obtainable.⁶

The actual cultivator pays a fixed share of the produce of his holding, either in money or in kind, to the State direct.⁷ Excepting one pargana⁸ (that of Choti Sadri, where the entire revenue is determined by the system of cash rents on the measured bigha, irrespective of crop), everywhere in Meywar three methods of realisation prevail:—

- (1) The actual division of the produce,
- (2) The division of produce by conjectural estimate of the crop on the ground; and
- (3) The crop-rates, i.e., money-rates varying with the kind of crop sown.

In regard to (1) and (2), the share taken by the State ranges from one-half, which is the most common, to one-fourth. And, besides this, an impost varying from one seer to ten seers per maund⁹ on the Government share is, in most cases, exacted. In numerous cases, an addition to the fixed share of produce, a money-tax is levied, the amount of which is limited only by the forbearance of the officials, or the capability of the village to meet the demand.

As regards (3), the crop-rates,¹⁰ these are applied to valuable crops other than the food-grains, and vary with the kind of crop sown; sugarcane¹¹ has a rate varying from Rs. 4 to 10 per bigha; cotton from 8 annas to Rs. 2 on dry land to Rs. 2 to 10 on irrigated land; tobacco from Rs. 3 to 10; and opium from Rs. 1 to 8.

A custom, which is common to all three systems of collection,¹² is that whenever new land is taken up, or a new well sunk, the demand (whether in kind or cash) for the first few years is purposely kept light.

In 1871-72 an attempt was made to change the system of division of crop into a cash assessment,¹³ and some sort of measurement on classification of soils became necessary. Accordingly in twenty parganas the bulk of the cultivated area was either surveyed or estimated and divided into appropriate classes for assessment.¹⁴ But the pargana officials were either incompetent to carry out such a plan, or they found that it would not be in their interest to do so, and the attempt fell through after a short time. Taking the figures obtained thus,¹⁵ and generalising them for the whole State, Mr. Smith finds that the total cultivated area of the ordinary revenue-paying area of the State is 483,085 bighas, or 257,912 acres, or 403 square miles. In other words, out of 12,670 square miles, only just 403, or little more than 3 per cent. of the area of the State, go to form the cultivated area

¹ Rajputana Gazetteer, p. 190.

² Mr. Martelli's reply to Famine Commission's Enquiries, Chapter I, Question 3.

³ Rajputana Gazetteer, pp. 1 and 83, and reply of Captain Barr, Political Agent, to Chapter I out of Enquiries.

⁴ Pages 1 and 84.

⁵ Chapter I. Preliminary Observations.

⁶ Rajputana Administration Report, 1877-78, p. 99.

⁷ Captain Barr's reply to Chapter I, Question 13.

⁸ Captain Barr's reply to Chapter I, Question 3.

⁹ Rajputana Gazetteer, pp. 1 and 84.

¹⁰ *Ibid.*, p. 1 and 84.

¹¹ Rajputana Administration Report, 1877-78, p. 232.

¹² *Ibid.*, p. 232.

¹³ Rajputana Gazetteer, p. 1 and 84.

¹⁴ Rajputana Administration Report, 1877-78, p. 23.

¹⁵ Reply of Major Cadel, Political Agent, to Famine Commission's Enquiries, Chapter I, Question 8.

¹⁶ *Ibid.*, Questions 3 and 4.

¹ Rajputana Administration Report, 1877-78, p. 23.

² Dated 28th April, 1878 (in Foreign Department Collection).

³ *Ibid.*, p. 3.

⁴ *Ibid.*, p. 6.

⁵ *Ibid.*, p. 4.

⁶ Foreign Department Collection, p. 20.

⁷ *Ibid.*, p. 13.

⁸ *Ibid.*, p. 15.

⁹ *Ibid.*, p. 16.

¹⁰ *Ibid.*, p. 16.

¹¹ *Ibid.*, p. 37.

¹² *Ibid.*, pp. 16, 17.

¹³ *Ibid.*, p. 20.

¹⁴ *Ibid.*, p. 20.

¹⁵ *Ibid.*, p. 21.

of the crown lands. And of this 20½ per cent is irrigated.¹

The incidence of the rate on the cultivated area of 257,912 acres is—taking the average of the land-revenue, Rs. 12,34,784, as noted in the statement which follows—Rs. 4-0-2 per acre. The average rates on the different classes of soils is as follows² :—

Soil.	Rate per acre.		
	Rs.	A	P.
Irrigated - - - - -	9	14	3
Unirrigated, manured, within a certain distance from home - - - - -	4	1	10
Unirrigated, unmanured, in outlying parts of village - - - - -	1	10	8
Land far away in waste area - - - - -	0	7	7

The following statement shows the revenues of the State from 1871-72 to 1876-77 :—

YEARS.	Mal. (a)	Lagat. (b)	Siwal (c)	TOTAL.
	Rs.	Rs.	Rs.	Rs.
1871-72 - - -	11,09,185	2,23,760	1,11,595	14,44,540
1872-73 - - -	13,46,802	1,63,101	1,20,441	16,31,344
1873-74 - - -	12,63,206	1,92,935	80,670	15,42,811
1874-75 - - -	12,96,010	1,76,532	79,622	15,54,203
1875-76 - - -	11,75,595	1,74,019	75,823	14,25,437
1876-77 - - -	12,17,181	1,70,517	1,20,555	15,08,253*
Average -	12,34,784	1,81,816	99,130	15,15,730

- (a) Land-revenue derived from the rent-paying area.
 (b) Town-dues, miscellaneous offerings to the State on appointments, new holdings, military service tenures.
 (c) Fees paid into the criminal and civil courts.
 * Including arrears of Rs. 62,721.

These figures are taken from Appendix A to Mr. Smith's report,³ but in the report itself somewhat different figures are given for the year 1876-77, which makes the total revenue of that year Rs. 18,48,451. And the average revenue for the six years would, it is said, be about Rs. 18,75,000. This is probably made up by adding the incomes derived from customs, chatund, surplus revenue of Akola, Mhairwara under British management, &c, which Mr. Smith seems to have omitted from the statement in the Appendix. If we take Rs. 18,75,000 as the average revenue, and divide it by the figure of population (1,134,700), we have an average incidence of taxation at Rs. 1-10-5 per head. But then Rs. 18,75,000 include the surplus revenue of Akola, the revenue of Mhairwara, &c., and these should not perhaps be taken into account, as the figure of population (1,134,700) does not include the inhabitants of those districts. Taking, then, the average revenue to be Rs. 15,20,000, we find the incidence of taxation in the Udaipur State to be Rs. 1-5-5 per head.

VII.—ALWAR.

Alwar is said in the Rajputana Gazetteer⁴ to have an area of 3,380 square miles and a population according to a careful census taken in 1871 of 778,596. The Gazetteer⁵ of Alwar, however, gives an area of 3,024 square miles and a population of 800,000.

The land-revenue⁶ of the State was Rs. 19,20,724 in 1873-74; gardens, canals, forest dues, grass-lands, tribute from jagirdar, and other miscellaneous sources yielded Rs. 79,873; customs, excise, salt gave Rs. 1,46,959; court-fees, fines and stamps Rs. 40,232; mint, iron furnaces, discount, interest, saving of pay, refunds, nazul, post office, school fund, dispensary fund, and small miscellaneous sources yielded Rs. 87,533;

and there was an "extraordinary cash balance of Rs. 6,90,204." These made up with an arrear demand of Rs. 48,990, a total revenue of Rs. 30,14,515; but without the cash balance the total income of the year was Rs. 23,24,311. The total revenue in the previous year (1872-73) had been Rs. 22,87,201, and the estimates for 1874-75 were Rs. 22,70,464.

Two summary settlements of the land-revenue were made by Captain Impey¹: one was for three years and expired in 1871; for the other a settlement officer was appointed in January 1872 with directions to make a regular settlement of the revenue, but as this would take time, a new summary settlement was at once made, and the regular settlement came into force on the 1st September 1876.² The mean average of the rent rates on which the assessment at this settlement was based is about Rs. 2-12-0. The rates for irrigated land vary a great deal, but give an average of Rs. 4-0-6; those of unirrigated land give one of about Rs. 1-9-7. The land-revenue usually equals two-thirds of these rates. The portion of the net assets fixed as the State's share³ was generally two thirds. But where three-fourth or more had been paid without apparent difficulty, three-fourths were determined. The sums paid⁴ to the State by the landholder would be two-ninths of the gross produce.

The revenue is paid in two instalments in each season⁵. They are so arranged as to admit, as far as possible, of the zemindar selling his crops or collecting his rents from his cultivators before his first instalment becomes due. And the several instalments bear a fair proportion to the value of the several harvests from which the revenue or rent has to be made good. A rate of interest at Rs. 3-2 per cent. is charged on land-revenue in arrears.

The total area under cultivation cannot be ascertained as a field survey of only the fiscal villages, i.e., of about five-sixth of the area of the State, was made.⁶ The figures as regards the fiscal villages, however, are as follows :—

Total cultivated area -	Acres. 13,42,588
„ culturable area -	2,52,642
„ unculturable area -	7,40,344
„ revenue-free in fiscal villages -	82,404
Grand total area -	24,17,978

The land revenue of the State was in 1873-4 (see preceding page) Rs. 19,20,724; this on the total cultivated area of the fiscal villages gives a rate of Rs. 1-6-11 per acre.

VIII.—BHARTPUR.

For the Bhartpur State the figures given do not agree; thus, in the Rajputana Gazetteer the area of the State is said on page 1 to be 1,824 square miles, and on pages 131 and 147 the area is given as 1,974 square miles. On page 159 the details by parganas are given, which are said to be founded on a census taken in 1867 by the Political Agent; these details give a total area of 1,974 square miles.

The population is given on pages 83 and 131 as 743,710, and on page 147 as 650,000. On page 157 it is said that the population was formerly estimated at 600,000, but that a regular census was taken (as mentioned above) by the Political Agent in 1867 which was considered by him to be fairly correct, possibly rather under than over rating the population; this census showed a population of 743,710.⁷ In the Administration Report of 1873-74, however, it is stated⁸ that there is reason to believe that since this census was taken the population has increased; but no reason is given for this belief.

The revenues of the State⁹ amounted in 1863-64 to

¹ Foreign Department Collection, p. 22.

² *Ibid.*

³ Page 9.

⁴ Printed in November, 1878, pp. 1 and 84.

⁵ Published in 1878.

⁶ Alwar Gazetteer, p. 100.

¹ Alwar Gazetteer, pp. 183-184.

² Major Law's reply to Chapter I, Question 13.

³ Alwar Gazetteer, p. 184.

⁴ Major Law's reply, Chapter I, Question 13.

⁵ Major Law's reply.

⁶ Alwar Gazetteer, p. 87.

⁷ *Ibid.*, p. 188.

⁸ Rajputana Gazetteer, p. 159.

⁹ *Ibid.*, 157 and 158.

¹⁰ Rajputana Gazetteer, p. 177.

Rs. 26,29,664. In 1873-74, they had increased to Rs. 31,70,193; thus—

	Rs.
Land-revenue	18,02,043
Salt and Customs	4,81,969
Administration and Public Departments, Public Works	
Department and Mint	53,171
Other items from parganas	4,62,538
Deshi villages	2,69,693
Advances to cultivators	1,00,060
Birth of loan-apparant	719
Total	31,70,193

In 1875-76 the total revenues amounted to Rs. 30,95,900, of which Rs. 17,79,793 were from land-revenue.¹

A regular settlement of ten years was made in 1873-74,² by which the total land-revenue amounted to Rs. 20,16,584. This represents³ the one-sixth portion of the whole produce of the State. This rental was, says Mr. Spencer, fixed after much reflection from data prepared during the minority, and can be collected with ease; the inhabitants of a few villages who complained that the assessment was a heavy one have been placed under the kham system.

The assessment is one-sixth of the produce,⁴ and from this the hak mukadami of one-third is deducted; the actual assessment is therefore only one-ninth.

"The custom of selling land does not prevail in this State. If the revenue remains long unpaid, the defaulter's share of the land is transferred to some other individual in return for the liquidation of the debt; the former only gets possession of it on recouping the latter."⁵

The zemindar cannot raise the rent above the amount prescribed by the settlement.⁶ The rent paid by the ryot, that is the full assessment of one-sixth without the deduction of the hak mukadami and the zemindari share of one-twelfth, varies from Rs. 1-14-2 per acre in Gopalgarh to Rs. 1-0-11 per acre in Dug, the respective produce value of each being Rs. 8-5-6 and Rs. 4-2-8. The ryot pays his rent in either money or kind (generally the former) to the zemindar.

The total culturable area in the Bharatpur State is given by Mr. Spencer as 737,546 acres.⁷ In his reply to questions 3 and 13 he mentions the area under cultivation as 766,014 acres. The Rajputana Gazetteer, apparently basing its statements upon the results of the settlement of 1873-74, says:⁸ "The total amount of cultivated khalsa land is 1,692,892 bighas,⁹ the average actual assessment of which is Rs. 1-3-0¹⁰ per bigha¹¹, and the average produce Rs. 10-11 per bigha."¹² The amount of uncultivated waste is 266,142 acres, of culturable waste 111,675 acres, of rent-free holdings 120,322 acres, making a total area of 1,263,403 acres.

The land-revenue being as stated above Rs. 20,16,584, this on the total cultivated area of 766,014 acres gives a rate of Rs. 2-10-1 per acre.¹³

IX.—DHOLPUR

Of the Dholpur State the area is differently stated in different passages of the Rajputana Gazetteer; thus on page 1 it is 819 square miles, and on page 243 it is 1,174 square miles. The population is 227,976 according to a rough census of 1876.¹⁴

A regular land and revenue settlement, carried out under the orders of the Government of India by Mr. W. H. Smith, was brought to a close in March 1878. According to this settlement, the State comprises an area¹⁵ of 1,193 square miles, and has a population¹⁶ of

238,945. Of the area (in acres 763,462),¹⁷ 376,461 are not assessed, being barren, water-site, jagir and maafi tracts. Of the remainder, 124,432 acres are culturable land, and 262,569 acres are cultivated. Of the cultivated area 67,102 acres are, and 179,516 acres are not, irrigated. Looking at the lands with reference to the revenue they yield to the State itself, we find:—

	Acres
Revenue-paying khalsa villages	564,191
Revenue-free: { Surmathra and Righanm	
taluks	127,052
Maafi	27,573
Jaghir villages	44,646
Total	763,462

Of the khalsa area, only 211,089 acres are cultivated¹⁸; and of this 58,113 acres are irrigated, mostly by wells. Irrigation is almost wholly confined to the fields adjacent to the village¹⁹; manure is readily obtainable, and is largely used within the irrigated limits. Nearly all the watered area, therefore, bears a double crop, some of it a treble crop; and the dolfash area is 31,748 acres.

We have seen that of the khalsa area of 564,191 acres, only 211,089 acres are cultivated, the culturable area is 100,080 acres;²⁰ and this large area, owing to the scarcity of population in Dholpur, lies waste.²¹

The rent rates paid by the cultivators, zemindars, and tenants alike²² are based on the value of the land; and this is fixed primarily by reference to its proximity to the village site, and only secondarily and in certain cases follows any distinction of natural soil. "The system involves three circles round the site. The nearest or the inner circle is the most valuable and pays the highest rates; the middle one is the next in importance," and so on.

The State retains²³ for itself the proportion of 75 per cent. of the whole assumed rental assets, resigning 24 per cent. to the zemindars.

The assumed rental of the cultivated khalsa area (211,089 acres) is Rs. 9,30,895, giving a rent rate of Rs. 4-6-7 per acre; the total revenue assessed is Rs. 712,989, giving an average of Rs. 3-6-1. The irrigated area is 27½ per cent. of the cultivated. Good unirrigated upper land covers 41 per cent., bad unirrigated 17 per cent., of the total cultivation.

Taking each pargana separately,²⁴ the incidence of the average rates are as follows, except in the Kheragarh²⁵ pargana, which has not yet been assessed.

	Rates on areas.					
	Irrigated.			Unirrigated.		
	R.	A.	P.	R.	A.	P.
Dolphur	7	9	5	3	3	3
Bah Pinahat	5	5	6	3	13	7
Fatehabad	5	5	9	3	1	2
Iradatnagar	6	0	9	3	14	11

The total normal income of the State is not given in any of the reports before us—all we can obtain are the figures of the Budget Estimate of 1878-79, which shows:²⁶—

	Rs.
Land-revenue, including Rs. 30,000 from Tankadars, and Numrole, and Rs. 200 from Ubari	7,05,200
Customs, abkari, toll, &c.	69,000
Fines, stamps, &c.	10,200
Nazur	5,500
Other miscellaneous sources	42,100
Total	8,32,000

It will be noticed that the land-revenue here estimated for is much below that fixed by Mr. Smith's settlement. This probably is because the estimates were drawn up before the settlement came into force. Taking the estimated figures, and dividing by the figure of population (238,945), we have an incidence of taxation at Rs. 3-7-8 per head. If we take the land-revenue figure from the settlement report, and let the other

¹ Rajputana Administration Report, 1877-78, p. 129.

² Rajputana Gazetteer, p. 154.

³ Reply of Mr. Spencer, Political Agent, Chapter I, Question 13.

⁴ Rajputana Gazetteer, pp. 154 and 155.

⁵ Mr. Spencer's reply, 1, 14.

⁶ Rajputana Gazetteer, p. 155.

⁷ Mr. Spencer's reply to Chapter I, Question 2.

⁸ Page 155.

⁹ In acres, 766,014.

¹⁰ Mr. Spencer (Question 13), says Rs. 1-3-9 (per acre Rs. 2-11 6).

¹¹ Per acre Rs. 21.

¹² Per acre Rs. 26-11.

¹³ Rajputana Gazetteer, p. 262.

¹⁴ Mr. Smith's Report in Foreign Department Collection, p. 9.

¹⁵ Ibid, p. 13.

¹⁶ Mr. Smith's Report in Foreign Department Collection, p. 36.

¹⁷ Ibid, p. 12.

¹⁸ Ibid, p. 10.

¹⁹ Ibid, p. 12.

²⁰ Page 13.

²¹ Page 31.

²² Page 32.

²³ Page 31. But the rates in this pargana are, Mr. Smith believes, very much the same as in Dholpur.

²⁴ Rajputana Administration Report, 1877-78, page 189.

items of revenue stand, we have a total income of Rs. 10,57,635 and an incidence of taxation at Rs. 4-6-9 per head.

X.—JAIPUR.

The Jaipur State can give no statistics. Its area is estimated in the Rajputana Gazetteer¹ as 14,882 square miles, and the population of the whole State at 1,900,000.²

Regarding the area under cultivation, Colonel Benyon, the Political Agent, says³ there is very little information available on this head: no statistics are forthcoming, and the Durbar's statements are very incomplete. He, however, thinks he is not, perhaps, far from the mark in putting down the cultivated area at one-tenth of the whole. But even this, he says, is a mere conjecture, there being no reliable data forthcoming.

No information is available either relative to the system of assessing the land-revenue. The Administration Report⁴ says of the land-revenue of the State, that it continues to be the weakest part of the Jaipur administration. The revenue derived from the land is not stated. The gross income of the State is said to have been Rs. 37,88,220, but the Administration Report adds:—"As there is always a disposition on the part of Native States to understate their receipts, these figures must not be considered as very accurate."

XI.—KARULI.

The Karuli State has an area of 1,260 square miles, and a total population of 140,000.⁵ Its revenues in 1877-8⁶ were:—

	Rs.
Land-revenue - - - - -	1,53,948
Tributes - - - - -	27,752
Customs - - - - -	40,556
Cesses - - - - -	2,821
Contracts (tobacco and spirituous liquors) - - - - -	2,800
Civil court-fees, &c. - - - - -	6,800
Forests - - - - -	4,000
Other miscellaneous revenue - - - - -	20,742
Bapoti - - - - -	15,156
Total - - - - -	2,74,575

No statistics are, however, available to us of the area under cultivation, nor is information obtainable as to the system of assessing the land-revenue.

XII.—BUNDI.

The State of Bundi is said, on page 1 of the Rajputana Gazetteer, to have an area of 1,917 square miles, but on page 203 of the same book the area is given as 2,218 square miles. The population is stated on page 83 to be 224,000, but on page 221 it is given as 218,671; this last figure is based on "an enumeration recently made, but it is only approximately correct."

The cultivated area cannot be given exactly, as it varies greatly each year.⁷ Sometimes a large quantity of new land is brought under, at others large areas are thrown out of cultivation, and remain fallow for some years. The State returns estimate the cultivated area at 475,471 acres (1,008,000 bighas), and the culturable waste at 1,084,905 acres.⁸ The remainder is wholly unculturable, owing to the rocky, sterile, and water-scarce nature of a large portion of the State.

The State has the option of realising its dues from the cultivators, either in cash or in kind, according to established rates.⁹ Where the rent is payable in cash, the talukdar, or his subordinate, goes the rounds of the villages before the harvest is gathered and measures the holdings of each cultivator.¹⁰ When this is finished the collection begins, which takes up about two months.

The division of produce (bata) is made by the revenue officer, who proceeds to the village, when the whole produce is stacked in the common stacking yard of the village, and divides the whole produce according to the proportion due to the State and the tenants. The

grain so collected is either stored and afterwards sold on the spot, or sent to Bundi, as ordered.

The total revenue of the State is estimated at Rs. 10,14,000,¹ of which about Rs. 8,50,000 are derived from the land, this, on the cultivated area of 475,471 acres, gives a rate of Rs. 1-12-7 per acre. Out of the total revenue, Rs. 3,50,000 are absorbed in assignments, allotments, and endowments, leaving the effective income of the State at Rs. 6,64,000, of which about Rs. 64,000 come from customs. "But it is not possible to obtain accurate accounts of the finances, though these figures probably give a fair general idea of the State's resources."

XII.—KOTAH.

Of the Kotah State the area is 4,484 square miles,² and the population is estimated to be 527,000.³ One hundred and fifty thousand acres⁴ of excellent culturable land lay unutilised,⁵ and in 1877 rules were drawn to induce cultivators to take a lease of this land, the terms of the lease being "occupation, on a nominal or very low rental for three or four years, and exemption afterwards from four land cesses, imposed recently by oppressive ministers." In consequence of these concessions 15,000 acres of waste were taken up in 1877. The total area under cultivation cannot, however, be ascertained.

There are three revenue instalments,⁶ the first of 25 per cent is due at the beginning of November, a month before the kharif can be sold; the second of 45 per cent at the beginning of February, and the balance in May. Arrears are considerable, and interest is charged on arrears at 12 per cent per annum. But it is remitted in many cases when the chance of getting it is remote, and it never is allowed to exceed the principal.

A land-revenue settlement is being carried out in the State.⁷ In 1876-77 two parganas out of the fifteen in the State had been surveyed. In 1877-78 two more were completed, and the work is now being pushed on more rapidly. The two first surveyed have been assessed and the revenue raised 8 and 6 per cent respectively; the assessment rates, therefore, are now in these two parganas Rs. 2-10 per acre on dry, and approximately Rs. 10 on wet land.⁸

The land-revenue⁹ (arrears and current) of the State in 1876-77 was Rs. 16,86,429; customs and alkari produced Rs. 3,27,947; fines, fees, and stamps, brought in Rs. 49,104, mint, Rs. 9,546; tributes from jagirdars and Harauti fiefs amounted to Rs. 62,433, and other miscellaneous sources, such as exchange and interest, savings of pay and refunds, forests and grass lands, garden, &c., yielded Rs. 88,687, making in all a total income of Rs. 22,24,146.

The revised total estimate of receipts for 1877-78 was Rs. 21,60,106; the decrease was no doubt owing to the scarcity and high prices.

XIII.—JHALLAWAR.

We come next to the Jhallawar State.¹⁰ Its area is given as being 2,146 square miles, and its population is said to have been estimated in 1866 at 226,000. The area under cultivation or that lying waste is not stated.

A summary settlement¹¹ for five years has been concluded—

"The demand now made is under half a lakh in excess of the average collections for the last ten years, while the cultivators have been relieved of the additional burden which the exactions and peculations of the former pargana officials imposed upon them." "At the same time the terms are very advantageous to the contractors, who are in the great majority of cases patels of villages, especially in regard to the cultivation of waste and fallow land, and care will have to be taken that they do not acquire proprietary rights in these lands, which are said to be of considerable extent."

Land situated on the banks of some of the larger streams and apt to be cut up and denuded of soil by inundations, as frequently happened, are allowed "flood remission."

¹ Page 1.

² Rajputana Gazetteer, p. 83.

³ Reply to Famme Commission, Chapter I., Question 3.

⁴ Page 76.

⁵ Rajputana Gazetteer, pp. 1 and 84.

⁶ Rajputana Administration Report, 1877-78, p. 134.

⁷ Rajputana Gazetteer, p. 230.

⁸ *Ibid*, p. 231.

⁹ *Ibid*, 231.

¹⁰ *Ibid*, 234.

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¹ Rajputana Gazetteer, p. 225.

² *Ibid*, p. 1.

³ *Ibid*, p. 83.

⁴ Administration Report for 1877-78, p. 202.

⁵ Political Agent's reply to Chapter I., Question 3.

⁶ *Ibid*, Question 13.

⁷ Administration Report for 1877-78, pp. 199 and 200.

⁸ Political Agent's reply, Chapter I., Question 13.

⁹ Administration Report for 1877-78, p. 204.

¹⁰ Rajputana Gazetteer, pp. 1 and 83.

¹¹ Administration Report for 1877-78, p. 22.

¹² Political Agent's reply, Chapter I., Question 2.

The revenue derived by the Jhallawar State from "pargana receipts" is about Rs. 12,96,434; from customs, Rs. 1,18,415; and from miscellaneous sources, Rs. 1,68,425, making a total annual income of about Rs. 15,83,278.

XIV.—TONK.

The area of Tonk (in Rajputana) is said to be 1,688 square miles, and the population 320,000.¹ No figures of the cultivated and waste areas are available.

Proprietary right in the land seems to be recognized;² for holders can sell their land, and ryots absent for years are allowed on their return to occupy their lands. Many villages are given in contract, usually to outsiders, but the tenure is ryotwari. The system of assessing the land-revenue is not described. Rents are generally paid in cash, not in kind; and rent rates, once established, do not vary.

The annual income of the State from land-revenue³ is given as Rs. 9,17,452, and from customs as Rs. 1,42,185, making a total of Rs. 10,59,637.⁴

XIV.—PARTABGARH.

About the Partabgarh State all we know is that its area is estimated to be 1,315 square miles, and its population 150,000.⁵

XV.—DUNGARPUR.

Of the Dungarpur State the area is said to be about 952 square miles.⁶ The estimated population is said, on page 83 of the Rajputana Gazetteer to be 100,000, but on page 281 it is stated that the number of the entire Hindu population is estimated at 175,000; that three-fourths of the whole of the inhabitants are Hindus, one-eighth are Jains, and one-eighth Mussalmans; and that Bhils aggregate some 10,000. This calculation would give a total population of 243,333.

Regarding the cultivated and uncultivated areas we have no figures. There appears to be no fixed rule for determining the amount of collection to be paid by each town or village in the State. The land is not measured nor rented at a fixed sum for each bigha. The methods usually followed for adjusting payments are the following:—

"At the spring and autumn harvests, a Government officer is detached who, after inspection of the crops, settles with the patel the sum to be paid to the State.⁷ It is often made a matter of interest to the individuals so employed to rate the produce below its just value."

Another method which now obtains, and which has for some years past prevailed, is thus described:—

"Once a year the officers of Government call in the patels, and having ascertained from them the sum each village is capable of yielding, fix the amount of the several heads of collection."

If the patel makes false statements, or underrates the produce of his village, he is liable to "the severest treatment," and to the payment of Rs. 11 for every 1 in the deficiency between the sum stated and the actual value.

The heads under which the revenues were to be collected were twenty-one in number, and were fixed about one hundred and ninety years ago. The chief heads were:—

"Ground rent, various cesses for the payment of the salaries of Government officials, the chiefs' family, foreign mercenaries and other miscellaneous imposts: all these assessments were not charged on every place, but they were all fixed sums. The system, as then established, although subjected to much modification at various times, remains in vogue to the present day; but one important alteration has been made, and that is that the cultivator has now, in addition to the money payments, to yield a portion of his crop. From some villages a third of all the grain produced is taken, and from others a fourth, whilst the remaining charges are raised or

"lowered according to the quantity the cultivator is permitted to retain. Sometimes the proportion of grain claimed by the State is delivered in kind, and sometimes the cultivator pays its price in cash, according to the rates prevailing at the time. Every village is not subjected to this demand; but those that are exempt are cessed in a higher degree under other heads, whilst such places as are in an impoverished or desolate state pay the grain charge, but no other."

The total "land-revenues"¹ of the State were ascertained some years ago by carefully prepared statistics to be about Rs. 1,83,350, of which Rs. 79,688 went to the State, Rs. 91,967 to the Thakurs, and the balance to the religious orders. In 1876-77, however, owing to scarcity and high prices, Rs. 76,156 were derived from land-revenue by the State.² In that year the revenues under other heads were, "Sookree" tax levied by Durbar officials employed in collecting rents Rs. 13,000; customs and alkari Rs. 19,901; and other miscellaneous sources Rs. 7,943.

XVI.—BANSWARA.

Lastly, the Banswara State is said on page 1 of the Rajputana Gazetteer to have an area of 1,322 square miles, but on page 102 the area is said to be between 1,400 and 1,500 square miles.

The population is said to be generally estimated at 150,000.³ There are no statistics available of the cultivated and uncultivable areas. The land is not measured, nor is it rented at a fixed rate for each bigha, but the collection is adjusted usually as follows:—

"At the time of the autumn harvest, the headmen of the villages, attended by some of the respectable inhabitants, appear before the officials. After some discussion and comparison of the produce of former years with the actual condition of the villages, the sum to be paid for the whole year is determined, and a written agreement to pay is given by the cultivators."

"The collection of the money-rent for the whole year is made after the rain crop at the Dewali; this cess is termed *barar*. A second levy is made after the spring crop, which is termed *kuntu*; this is paid in kind. The probable outturn is estimated, and the cultivator pays a certain fixed share, varying according to the village custom from one-sixteenth to one-quarter or sometimes half, the money cesses being raised or lowered according to the quantity allowed to be retained. Sometimes the proportion of grain claimed by the State is paid in kind, and sometimes its value is paid in money, according to the rates prevailing at the time."

"Those places from which money payments are not levied have to yield a third of the crop, a commutation being usually allowed to villages that are in an impoverished state."

There are several other cesses; in fact, the collection of revenue is on an irregular and arbitrary system.⁵

"The cultivators are liable to various indefinite demands; they are also incessantly required to satisfy other calls supposed to be occasional or emergent. When a chief dies, a tax must be levied on the villages to defray the expenses attendant on the investiture of his successor. When he marries, or any of his children are given in marriage, a like demand is made. Similarly to every extraordinary expense of the State the cultivators are compelled to contribute. All these uncertain and unlimited taxation keep up fraud and concealment on one side to resist extortion and violence on the other."

The land-revenue of the State for 1873-74, including "sawai," was 151,365; from customs the State derived Rs. 34,785; from civil and criminal court-fees and fines Rs. 12,479; from nazarana Rs. 5,407; and from other miscellaneous sources Rs. 12,935, making in all a total annual income of Rs. 2,16,971.

The information above summarized may be condensed in the following statement.

¹ Rajputana Gazetteer, pp. 1 and 84.

² Political Agent's reply, Chapter I., Questions 10, 14.

³ Administration Report for 1877-78, p. 113.

⁴ Rajputana Gazetteer, pp. 1 and 84.

⁵ *Ibid*, pp. 1 and 273.

⁶ *Ibid*, p. 279.

¹ Rajputana Gazetteer, p. 280. *Note*.—The head "land revenue" is rather undefined here, seeing what follows.

² Rajputana Administration Report for 1877-78, p. 66.

³ Rajputana Gazetteer, pp. 83 and 116.

⁴ *Ibid*, 113.

⁵ *Ibid*, p. 113.

SECTION.	STATES.	Approximate Area in Square Miles.	Population.	Cultivated Area, in Acres.	Land-revenue.	Incidence of Land-revenue per Acre.	OTHER REVENUES.					Total Revenue, including Land-revenue.	Incidence of total taxation per head of population.
							Salt, Customs, and Excise.	Courts-fees and Fines.	Administration, P. W. D. and Milit.	Nazrana.	Miscellaneous Revenue.		
Western or barren.	Bikaner -	22,340	310,000	—	Rs. 4,85,997	Rs. A. P.	Rs. 2,61,408	Rs. 76,173	Rs. —	Rs. —	Rs. 2,34,976	Rs. 10,58,554	Rs. A. P. 3 0 4
	Jaisalmer -	16,500	72,000	—	—	—	—	—	—	—	—	1,00,000	1 6 2
	Jodhpur or Marwar -	37,000	2,000,000	—	—	—	—	—	—	—	—	—	—
	Total	75,840	2,432,000	—	—	—	—	—	—	—	—	—	—
Central or hilly.	Kishengarh -	817	105,000	—	—	—	—	—	—	—	—	—	—
	Sirohi -	2,057	153,000	—	—	—	—	—	—	—	—	—	—
	Udaipur or Meywar -	12,670	1,135,000	257,912	Rs. 12,34,784	Rs. 4 0 3	—	99,130	—	—	1,81,816	Rs. 15,20,000	0 15 8
	Total	15,544	1,393,000	—	—	—	—	—	—	—	—	—	1 5 5
Eastern or fertile.	Alwar -	3,030	800,000	1,342,588	Rs. 19,30,734	Rs. 1 6 11	Rs. 1,46,959	40,232	87,533	—	79,873	Rs. 23,24,311	2 14 5
	Bharatpur -	1,900	750,000	756,014	20,16,584	2 10 1	4,81,969	—	53,171	—	8,33,010	33,84,734	4 8 2
	Dholpur -	1,193	238,945	211,089	9,30,395	3 6 1	69,000	10,200	—	5,500	42,100	10,57,695	4 6 9
	Jajpur -	14,800	1,900,000	—	—	—	—	—	—	—	—	37,88,000	1 15 10
	Karauli -	1,260	140,000	—	1,84,521	—	43,356	6,800	—	—	39,898	2,74,575	1 15 5
	Bundi -	2,200	250,000	475,471	8,50,990	1 12 7	64,000	—	—	—	1,00,000	10,14,000	4 9 9
	Kota -	4,484	527,000	—	16,86,429	—	3,27,947	49,104	9,546	162,433	88,687	22,24,146	4 3 6
	Jhalawar -	2,146	226,000	—	13,96,434	—	1,18,415	—	—	—	—	15,83,278	7 0 1
	Tonk -	1,680	320,000	—	9,17,452	—	1,42,185	—	—	—	—	10,59,637	3 4 11
	Parbhargarh -	1,215	150,000	—	—	—	—	—	—	—	—	—	—
	Dungarpur -	950	200,000	—	1,83,350	—	19,901	—	—	—	21,443	2,24,694	1 1 11
	Banswara -	1,400	150,000	—	1,51,365	—	34,785	12,479	—	5,407	12,935	2,16,971	1 7 1
	Total	36,258	5,621,945	—	—	—	—	—	—	—	—	—	—
	GRAND TOTAL	131,352	9,436,945	—	—	—	—	—	—	—	—	—	—

* In 1926-27. † Refer to fiscal villages only, i.e., five-sixths of whole area of the State. ‡ Tributes from jagdars and Haroti nobles.

CENTRAL INDIA.

There are in all eight Agencies in Central India comprising over sixty States of various sizes, ranging between 10,000 to within a couple of square miles in area.¹

The information obtainable for the purpose of this note is, however, very incomplete, and all that can be done is to notice the more important States, and to throw into one tabular statement such information as is forthcoming regarding all the States.

The most important rulers in wealth, power, and subjects are the great Mahratta Houses of Sindhia and Holkar, who rule respectively the Gwalior and Indore Territories.

I.—SINDHIA.

Sindhia's power extends over a territory of 33,000 square miles, with a population of 2,750,000; and he has a revenue of upwards of a million sterling.²

"Its revenue is elastic, for by Dinkur Rao's graduated settlement of Malwa, which Sindhia maintains, the ryots are prosperous * * The settlement was fixed not on regular survey, but by striking an average from the actual collections during a long series of years. It was made for twenty years from 1860, and in two periods, the lowest rate for the first ten, and the highest for the last. Knowing the steady rise in prices since the assessment, and the principle on which it was fixed, it may well be believed that the Gwalior ryot in Malwa has a margin of profit from six to twelve annas in the rupee. The settlement had another element of strength; it was made with the hereditary lumberdar or potal of the village, who cannot, however, in sub-letting, raise the rent of fields actually assessed, though he may benefit himself and the State in future by the culture of lands waste at the time of settlement."

No figures of cultivation can be obtained from the papers accessible to us, nor can details of the revenue be got. In 1870-71 the revenues were from—

Land including maafi holdings -	-	Rs. 97,15,123
Customs and additional revenue -	-	13,04,162
		<u>1,10,19,286¹</u>

In 1877-78 the total revenues are said to have been Rs. 82,59,358.² There seems to be some omission in this figure of receipts, or the falling off in the revenues would be very great. Supposing, however, that the total income of the Gwalior State is 110 lakhs and the population 2½ millions; then the taxation per head comes to Rs. 4 per head per annum.

II.—HOLKAR.

Of the Indore State neither the area nor the population can be ascertained, and there are no figures of cultivation forthcoming.

The contract system of land assessment prevailed twenty years ago;³ during the rule of the present Maharajah it has been abolished.

"Careful surveys have been made, but no uniform rate or term of settlement has been fixed. The highest price of grain is assumed as the point of departure; and the consequence is that the Durbar is continually pressed to lower the assessment of this or that village or district, and compelled to allow remissions arising from ordinary occurrences of seasons. The whole population is thus on the strain. Then the late introduction of the levy of *sirdesh-mukhi*, which the Mahrattas in their strength never imposed in Malwa, is a source of distress and vexation. It is 7 per cent on the rent paid by the cultivator, and Rs. 30, or 25 bighas of land, in every village levied at this rate in all jaghir villages also, and a charge of 7 per cent. is added to all sums of revenue, customs, transit dues, &c.: nothing escapes."

The revenues of the State in the three last years were as follows:

SOURCES OF REVENUE	a 1875-6.	b 1876-77.	c 1877-78.	Average.	References.
	Rs.	Rs.	Rs.	Rs.	
Land Revenue - - -	30,95,000	31,51,000	30,72,000	—	a and b Central India Administration Report, 1876-77, p. cxxvi.
Customs - - - - -	5,26,000	4,00,000	4,76,000	—	
Abkari - - - - -	1,17,000	1,00,000	1,21,000	—	
Tributes - - - - -	1,49,000	1,49,000	1,37,000	—	
Stamps - - - - -	67,000	78,000	55,000	—	
Fines - - - - -	70,000	63,000	61,000	—	c <i>Ibid</i> , 1877-78, p. clxxii.
Cotton-mill - - - -	79,000	3,07,000	—	—	
Post-office - - - -	5,000	4,400	6,000	—	
Mint - - - - -	8,000	2,400	25,000	—	
Miscellaneous - - -	1,08,000	1,43,200	2,67,000	—	
Total - - - - -	42,24,000	43,98,000	42,20,000	42,80,666	
Interest - - - - -	3,74,000	5,25,000	9,03,000	—	
Total - - - - -	45,98,000	49,23,000	51,23,000	—	

Of this State, the population not being figured in the reports and papers accessible to us, we are unable to calculate the incidence of taxation.

III.—BHOPAL.

The Bhopal Agency³ comprises ten States and fourteen guaranteed Thakurs; the former have a total of 10,209 square miles, and a total population of 1,095,778, and the latter have a total area of say 220 square miles, with a total population of about 14,500.

Of the States in this group, Bhopal, Rajgarh, and Narsinghpur are the principal ones. Bhopal, which is by far the largest, has an area of 8,200 square miles and a population of 769,200. No figures of revenue are given. As regards the land-revenue system in Bhopal, the Secunder Begum wiped out the contract system, which till then had prevailed, and had the lands measured and classified.

"Those actually under cultivation were assessed according to soil, those waste but culturable were given

"free for five years; after which for ten years the rise was to be gradual to the maximum: 10 per cent. of the collections were assigned to the holder of the village, and 6½ for village expenses."

Cultivators who break up new land are exempted from rent for three years.⁴ The revenue of the following classes of land is—⁵

	per Acre.	
	Rs.	
Kalamat or wheat land -	2½	Dependent on rainfall.
Bhamar, jowar-bajra land -	1½	
Siar or kodu, tilli land -	1	
1st class chahi, rice, sugar, cane, and opium land -	20	Watered by tanks.
2nd class ditto ditto -	10	Watered by wells.
3rd class ditto ditto -	6	Watered by rivers.

A twenty-years' settlement was commenced in 1874, and is being gradually introduced into the districts as

¹ Central India Administration Report, 1870-71, p. 2.

² *Ibid*, 1870-71, p. 2.

³ *Ibid*, 1877-78, p. iv.

⁴ *Ibid*, 1870-71, p. 5.

¹ Central India Administration Report, 1870-71, p. 15.

² *Ibid*, 1877-78, p. xi.

³ *Ibid*, 1870-71, p. 5.

⁴ Colonel Osborne's reply to Chapter I, Question 11.

⁵ *Ibid*, Question 13.

the pargannas are settled. The field rental under this settlement has not as yet been fixed, the question being under discussion by the Council of the State.¹

IV.—REWAH.

Next comes the Baghelkhand Agency, which comprises an area of about 14,000 square miles.² No census having ever been taken—

"It is impossible³ to give any information as to increase in the population of the country. Nor is it possible⁴ to give with any accuracy any statistics as to the average area under cultivation yearly, no survey of any kind having been made. There are⁵ no proprietary or occupancy rights in Baghelkhand and in khalsa villages, which form about one-third of the total number in the State; leases as a rule were given from year to year in order to prevent any such rights being established.

"The land-revenue is very little in excess of the gross rental: if the latter is greater than the former, it is from 7 to 15 per cent, the average being, say, 10 per cent.⁶ The average proportion of revenue to the value of the gross produce, inclusive of cultivator's charges, may be estimated roughly at one fifth."

Rewah, which is the principal State in the Baghelkhand group is said to have an area of 20,000 square miles, and a population of 190,000.⁷ As regards the area, there probably is some mistake, since we have just seen that the whole of the Baghelkhand Agency is put down as having an area of only 14,000 square miles.

The revenues of Rewah were as follows in the last two years:

	1876-77. ⁸	1877-78. ⁹
	Rs.	Rs.
Land-revenue - - -	6,17,152	5,24,747
Muamla and chauth - -	52,342	24,781
Customs and jungle produce	1,13,657	1,48,043
Fees and Fines - - -	11,748	8,024
Miscellaneous - - -	1,839	7,054
	7,96,739	7,12,649
Balance on 1st April -	86,118	34,865
Total -	8,82,857	7,47,514

Taking the income to be Rs. 7,54,000, the incidence of taxation appears to be Rs. 3-15-4 per head of population.

For the other States in this Agency no information is given in the reports consulted that may here be noticed.

V.—TEHRI.

In the Bandelkhand Agency Tehri is the chief State, with an area of 2,100 square miles, a population of 200,000, and a revenue of Rs. 5,75,000. The incidence of taxation is Rs. 2-14 per head.

In the Western Malwa Agency there are several States, but information thereon is wanting, except for one of them, the Rutlam State, on which the following particulars are found.

Kind of Grain.	Seed	Produce.	Price	Deduct for Seed and Rental.	Profit of Cultivator.
	Seers.	Seers.	S.S. Rs. A. P.	Rs. A. P.	Rs. A. P.
Wheat - - - - -	20	90	7 8 0	4 8 0	3 0 0
Channa - - - - -	20	100	6 4 0	3 14 0	2 6 0
Alsi - - - - -	7½	50	4 3 0	2 14 0	1 5 0
Jowar - - - - -	2½	80	5 2 0	2 4 0	2 12 0
Kapas - - - - -	5	70	8 4 0	2 2 0	6 2 0
Mucca - - - - -	5	365			
Opium - - - - -	5	5	72 0 0	17 0 0	65 0 0
Sugar-cane - - - -	Rs. 50	Goor. 160	160 0 0	82 0 0	78 0 0

¹ Mr. W. F. Pridcaux's supplementary reply to Chapter I, Question 10.

² Lieutenant-Colonel Bannerman's reply—Preliminary remarks.

³ *Ibid*, Chapter I, Question 2.

⁴ *Ibid*, Chapter I, Question 3.

⁵ *Ibid*, Chapter I, Question 10.

⁶ *Ibid*, Chapter I, Question 13.

⁷ Central India Administration Report, 1870-71, p. 13.

⁸ *Ibid*, 1876-77, p. xlv.

⁹ *Ibid*, 1877-78, p. lx.

VI.—RUTLAM.

In this state the revenue settlement is periodical; the existing settlement both of the khalsa and the jagir lands has been made for fifteen years. The settlement of the latter lands was reported on in 1869-70 and of the former in 1870-71. The total area was ascertained to be 778 square miles, or 497,920 acres.¹ There are—

	Acres.
Irrigated lands - - - -	11,721
Non-irrigated lands - - -	114,720
The culturable area is - -	158,043
	284,484
And the unculturable - - -	208,631
	493,115

302,176 acres are held by jagirdars and 190,444 acres by the State

The khalsa lands are thus divided:—

	Acres.
Cultivated—	
Irrigated - - - - -	3,439
Non-irrigated - - - - -	41,685
	45,124
Culturable - - - - -	73,009
Unculturable - - - - -	55,084
Dharmasala - - - - -	6,402
Chakra lands - - - - -	10,825
	190,444

There are altogether 24,577 agriculturists and 25,644 non-agriculturists, making apparently a total population of 50,221 in the State;² but this does not seem possible.

Mir Shahamat Ali says in his replies to the Famine Commission that the area under cultivation is nearly 568,969³ bighas, of which one tenth produces opium and the rest food crops. He probably includes in this figure the culturable area of 158,043 acres as given above.

The revenues⁴ of the Rutlam State were as follows in 1870-71:

	S.S.Rs.
Net land-revenue receipts - - -	2,74,740
Jagirs and dharmasalas - - -	7,49,744
Other sources - - - - -	3,11,012
Total - - - - -	13,35,496

The jama of each cultivator is fixed. No additional tax can be imposed during the term of the settlement, and the cultivator is moreover—

"allowed at the rate of 4 bighas of pasture land per plough rent-free, so that 27,484 bighas of land in the khalsa and jagir villages have been allotted to cultivators for that purpose. He can also bring under cultivation any portion of the culturable land, for which he will have to pay no tax during the term of the present settlement."

The average rates⁵ of assessment per bigha on wet

¹ Mir Shahamat Ali's reply, Chapter I, Question 9; and Central India Administration Report, 1870-71, pp. lxxviii and lxxix.

² Mir Shahamat Ali's reply, Chapter I, Question 3.

³ 284,484 acres.

⁴ Central India Administration Report, p. lxxx.

⁵ Mir Shahamat Ali's Annual Report of 1870-71 in Central India Administration Report.

Mir Shahamat Ali in his reply to the Famine Commission, however, says (Chapter I, Question 13)—

"The rate of revenue on cultivated land on the average is (Rs. 1-12, and on cultivated and culturable 14 annas per bigha 2 bighas=1 acre)."

land is S.S. Rs. 16-2-3, on dry land Rs. 2-6-3, on wet and dry Rs. 2-9-6, and on wet, dry and culturable land Rs. 1-7-3.

The table¹ on preceding page shows the profit derived by an agriculturist per bigha of his cultivation:—

Mr. Shahamat Ali says:—

"The proportion of revenue to the value of gross produce at the prevailing market rates is nearly one-fifth, both of dry and irrigated."

Next comes the Bheel Agency, for which no information of any kind is obtainable.

The Deputy Bheel Agency is said to have an area of 8,100 square miles, and a population of 239,541. In this Agency is the British district known as the Manipur pargana. The following information is given thereon.

VII.—MANPUR.

In Manipur the Government rates on cultivated land are—

"for dry land per bigha Rs. 1-2, for wet land per bigha Rs. 6-10. Some of the malguzars in settled villages sub-let their holdings on increased rates ranging in the case of dry land to Rs. 2-4, and in that of wet land to Rs. 7 or 8.² This increase of rates is a mere private arrangement and not recognized by Government. The Bheels pay at the rate of Rs. 3 per plough on dry and Rs. 4 per bigha on wet land. The rates in Manipur are much lighter than those prevailing within bordering Native territory, where the rate on dry land goes up as high as Rs. 3 per bigha, and from Rs. 8 to 20 on wet land."

A land-revenue settlement of seven villages was made in 1867 for a term of twenty years under the Government of India's sanction;³ the incidence of assessment was Rs. 1-2-9 per acre on cultivated area, and Rs. 0-15-9

on total malguzari or assessed land. The population of these seven villages was 1,479 in 1867, and it has since increased to 3,472. The total assessments amount to Rs. 3,420, giving an incidence of taxation of about one rupee per head.

The other villages of the pargana, being inhabited chiefly by Bheels and being in a backward state of cultivation, were excluded from the settlement.

The following figures referring to the whole pargana are available:—

YEAR.	Cultivated area	Revenue	Population.	Incidence of taxation
	Bghs	Rs.	No	Rs. A. P.
(a) In 1875-76 - -	5,308	7,233	3,938	1 9 5
(b) In 1876-77 - -	5,508	8,707	4,039	2 2 5
(c) In 1877-78 - -	6,328	8,784	4,039	2 3 0

(a) Central India Administration Report, 1876-77, pp. lxxviii and lxxix.

(b) *Ibid*, 1877-78, pp. cxi to cxiii.

(c) Population not given, cholera and small-pox said to have raged.

No details can be given regarding the other States owing to the want of information.¹ But looking at Central India as a whole, the Native States cover an area of 84,000 square miles, and have a population of nearly 8,000,000, "yielding a revenue to Chiefs and Thakurs probably not short of four millions sterling." Taking these figures, I find that there are 95 people to every square mile, and that the incidence of taxation is Rs. 5 per head of population.

¹ Central India Administration Report, 1870-71, lxxxvi.

² Chapter I, Question 13.

³ Pandit Sarup Narayan's reply to Chapter I., 13.

⁴ *Ibid*, supplementary reply to Chapter I., Question 10.

¹ Central India Administration Report, 1870-71, p. 2.

CENTRAL INDIA.

AGENCIES.	States.	Apparatus-Area in Square Miles.	Population.	Cultivated Area.	Land Revenue.	Incidence of Land-Revenue per Cultivated Acre.	OTHER REVENUES.				Total Revenue, including Land Revenue.	Incidence of Taxation per Head of Population.	REFERENCES.
							Salt, Customs, Abkari.	Court-Fees, Fines, &c.	Jagirs and Dharmshalas.	Miscellaneous.			
Gwalior -	Sindhia -	—	2,750,000	—	Rs. 97,15,124	—	Rs. —	Rs. 13,04,162	Rs. —	Rs. —	Rs. 1,10,00,000	Rs. A. P. 4 0 0	Central India Administration Report, 1870-71, p. 13 Ditto ditto, <i>ibid.</i>
Indore -	Holkar -	—	—	—	—	—	—	—	—	—	42,80,666	—	
Bhopal -	Bhopal -	8,200	769,200	—	—	—	—	—	—	—	—	—	
Baghelkhand -	Raigarh -	642	75,742	—	—	—	—	—	—	—	—	—	Ditto ditto, <i>ibid.</i>
	Narsinghpur -	720	87,800	—	—	—	—	—	—	—	—	—	
Bundelkhand -	Rewah -	—	190,000	—	—	—	—	—	—	—	7,54,000	3 15 1	Ditto ditto, p. 11.
	Tehri -	2,100	200,000	—	—	—	—	—	—	—	5,75,000	2 14 0	
	Saunthar -	175	30,000	—	—	—	—	—	—	—	4,10,000	13 10 8	
West Malwa -	Chirkari -	800	120,000	—	—	—	—	—	—	—	5,00,000	4 2 8	Ditto ditto, p. 11.
	Apigarh -	340	46,000	—	—	—	—	—	—	—	2,00,000	4 5 6	
	Chastirpur -	1,240	170,000	—	—	—	—	—	—	—	3,00,000	1 12 3	
Deputy Bheel Agency	Budlam -	778	—	—	S S Rs. 2,74,740	—	—	—	S S Rs. 7,49,744	S S Rs. 3,11,012	13,35,496	—	Ditto ditto, p. 13.
	Maunpur -	60	4,089	—	—	—	—	—	—	—	8,784	2 3 0	
	Barwani -	2,000	30,000	—	33,213	—	46,371	4,783	—	764	85,131	2 13 4	
Central India as a whole	Jamnia -	—	—	—	6,237	—	469	158	4,246	1,063	12,173	—	Ditto ditto, p. 11.
	Bagode -	2,500	150,000	—	—	—	—	—	—	—	6,00,000	4 0 0	
	Bagli -	300	17,000	—	—	—	—	—	—	—	70,000	4 1 10	
		84,000	8,000,000	—	—	—	—	—	—	—	4,00,00,000	5 0 0	Ditto ditto, p. 2.

KAPURTHALA (PUNJAB)

The Kapurthala State, properly so-called, has an area of 620 square miles and a population, approximately, of 258,372.¹

The State also possesses some territories in Ondh, which comprise an area of 700 square miles and a population of 225,067;² but to these this note does not refer.

In the Kapurthala State the area under crops in 1878-79 was as follows.—

	Food-crops	Non-food-crops.	Total.
	Acres.	Acres.	Acres.
*Autumn crops, 1878	47,395	29,430	76,825
Spring crops, 1879	135,795	7,775	143,570
Total	183,190	37,205	220,395

Among the autumn crops those occupying the largest areas were—

Sugarcane	-	-	-	-	Acres
Indian-corn	-	-	-	-	21,707
And moth	-	-	-	-	22,550

Among the spring crops there were—

Wheat	-	-	-	-	Acres.
Wheat and gram mixed	-	-	-	-	94,587
	-	-	-	-	23,366

The revenues of the State were as follows.—

	In 1877-78.	In 1878-79.
	Rs.	Rs.
*Revenue connected with land	8,70,383	8,62,428
Excise	11,023	12,628
Stamps	28,452	29,226
Octroi	11,747	14,492
Fines	5,572	3,878
Miscellaneous	94,042	36,994
Total	10,21,219	9,59,646
Interest on Government promissory notes	25,491	16,265
Grand total	10,46,710	9,75,911

The item of "revenue connected with land" is thus detailed.—

	1877-78.	1878-79.
	Rs.	Rs.
Land-revenue of 5 tahsils	7,23,148	7,32,085
Cesses	71,808	58,848
Fluctuating	3,625	2,411
Miscellaneous	38,833	39,136
Bhogpur estate	4,693	2,638
Jagirs in British territory	26,984	26,661
Cesses in British territory	1,292	649
Total	8,70,383	8,62,428

The above figures, on being averaged for the two years, bring out the following results, showing the incidence of taxation.—

	Population.	Land revenue and cesses.	Incidence per head.	Total revenue.	Incidence per head.
		Rs.	Rs. A. P.	Rs.	Rs. A. P.
*Kapurthala	258,372	8,66,405	3 5 8	9,90,432	3 13 4

The incidence of the land-revenue on the cultivated area as compared with that assessed in the adjoining British districts is illustrated by the following extract from Mr Rivaza's report for the year 1876-77

"The average rate all round per acre of cultivated land in each tahsil is—

	Rs.	A.	P.
"Sultanpur	3	7	9
"Kapurthala	1	13	3
"Dhilwan	4	14	1
"Nadala	4	7	7
*Phagwara	4	6	3

"The difference between these rates and those in force in adjoining British territory may be estimated by comparing them with the present rates in the Wayan and Bhanga parganas, which were settled by British officers, and according to the British standard of assessment. In Wayan, which adjoins Nadala, the average rate per acre on the cultivation is Rs. 2-3-10; and in Bhanga, which is the most fertile tract in the Kapurthala territory, it is Rs. 3-6. Bhanga is now included in the Dhilwar pargana, which, though its average fertility is less than that of Bhanga, pays a revenue rate of Rs. 4-14-1 per acre."

BOMBAY.

The Native States under the control of the Bombay Government³ cover an area of 63,295 square miles, and contain a population numbering 8,714,405⁴ at the date of the last census, 1872.

There are eighteen Agencies, which comprise eighty States, large and small, besides a great number of tribute-payers and others.

The information available for the purposes of this note is scanty, and the following is all that can be gathered

I—Cutch.

The Cutch State has an area of 6,500 square miles, exclusive of the Runn.⁵ Its population is 487,805, as ascertained by the census of 1872.⁶

In acres the area is 4,160,000.⁷ Of this, 2,205,000 acres are under cultivation: thus—

Food-crops	-	-	-	-	Acres.
Cotton	-	-	-	-	1,833,300
Fruit, flowers and miscellaneous	-	-	-	-	340,200
	-	-	-	-	31,500
	-	-	-	-	2,205,000

¹ Administration Report, 1878-79, p. 48.

² *Ibid.*

³ *Ibid.*, pp. 3 and 4.

⁴ *Ibid.*, 1878-79, p. 29.

⁵ Bombay Administration Report, 1875-76, Part II, p. 1.

⁶ Peint, Daffapur, and Juth appear to be excluded from the returns.

⁷ Area 9,000 square miles.

⁸ Bombay Administration Report, 1875-76, Part II, p. 1.

⁹ Reply of Manibhai Jasbhai, Dewan of Cutch, to Chapter I., Question 3 of Famine Commission's Enquiries.

¹ Administration Report, 1878-79, p. 5

² *Ibid.*, p. 40.

³ Total average Rs. 3-10-11.

⁴ Reply of Manibhai Jasbhai, Dewan of Cutch, to Chapter I., Question 3 of Famine Commission's Enquiries.

⁵ *Ibid.*, Chapter I, Question 6.

⁶ *Ibid.*, Question 10.

⁷ *Ibid.*, Question 13.

⁸ Bombay Administration Report, 1874-75, Part II, p. 3.

The revenues of the State were in¹—

	Rs.
1872-73	23,91,305
1873-74	23,59,305
1874-75	20,49,796

The decrease is said to have been caused by the unfavourableness of the season. The average of those three years gives a revenue of Rs. 22,66,802, which on a population of 487,395 shows an incidence of taxation at Rs. 4-4-8 per head.

II.—BHAUNAGAR.

Then passing on to the Bhavnagar State of the Kattywar Agency, we find that it has an area of 2784 square miles, and a population of 399,688 according to the census of 1872.

There are no regularly collected statistics to be had, but the following information which is supplied is said to be a near approximation to the truth.²

The lands are classed as follows³—

- (1) khalsa, or State lands;
- (2) barkhali, or lands comprising religious grants and service tenures;
- (3) mulgiras, or lands held by vassals.

Their respective areas are—

	Acres
Khalsa	1,186,000
Barkhali	251,000
Mulgiris	300,000
Total	1,737,000

About 40,000 acres have reliable means of irrigation.⁴ No details of cultivated areas are given, except that 3,000 acres are under sugar-cane and vegetables, and that in 1876-77 20,000 acres were under wheat and jowar.

For the bhag-batai system of collection of the revenue a cash settlement was substituted, based on the average net receipts of the previous two years. This was revised and continued for another four years in 1876. Its advantages to the State are very great, and that the bulk of the cultivators prefer it to the old system is shown by the fact of its almost universal acceptance.⁵

The average rate of assessment per acre is Rs. 3-3; and this is estimated to be four-tenths of the produce per acre.⁶

The revenues of the State were in—

	Rs.
1873	27,72,536 ⁷
1875-76	29,08,020 ⁸
Average	28,40,278

This average gives an incidence of taxation of Rs. 7-1-8 per head of the population.

III.—KOLHAPUR.

The Kolhapur State has an area of 2,778 square miles and a population of 802,691.⁹

The total cultivated area is¹⁰—

	Acres.
Under food-crops	1,049,348
Under non-food crops	95,882
Total	1,145,230

Of the former area the largest portions are occupied by—

	Acres.
Paddy	148,120
Ralla, wari, sawa	304,244
Jawari	331,157

and of the latter the largest areas are under—

	Acres.
Cotton	23,049
Sugarcane	13,214
Saffron	13,954
Til	17,281

The land is divided into¹¹—

- (1) inam, or free holdings;
- (2) sheri lands, or personal holdings of the Raja and subordinate chiefs;
- (3) ryotwari tenure, as settled by the Survey Department;
- (4) inam villages, koti and farmed villages.

Their areas are—

	Acres.
Inam	358,286
Sheri	5,810
Ryotwari	457,446
Koti, inam, or farmed villages	323,688
Total	1,145,230

“ The revenue survey settlement was introduced into the Kolhapur State in 1869-70; but all the rulings of Government are not rigorously brought into force.² The terms under which the survey settlement has been made will remain in force during the minority of His Highness the Maharaja. Further extension will depend on his pleasure, but it is not likely that there will be much departure from the system. The survey in no way deters proprietors and occupants of land from improving their holdings.”

The total area of land under cultivation is, we have seen, 1,145,230 acres. The total assessment realised therefrom is Rs. 22,29,583, thus giving on an average Rs. 1-15 per acre of cultivated land.³

The average amount of assessment on the bagayat irrigated land is Rs. 7, that on the tari (rice) land is Rs. 4, and on the khuski (dry crop) land Rs. 1, per acre. Where the survey settlement has been effected, the assessment is generally fairly distributed in all classes of lands. The old rates in some instances seem to have been disproportioned, and they are being revised by the Survey Department.⁴

There are no irrigational works in the territory.⁵

The land-revenue was in⁶—

	Rs.
1872-73	8,70,521
1873-74	8,94,102
1874-75	8,68,326 ⁷
Average	8,77,649

The total income was in⁸—

	Rs.
1872-73	28,71,521
1873-74	29,47,914
1874-75	nearly 31,00,000
Average	29,73,145

These average total figures, divided by the figure of population, give the following incidence of taxation :—

	Rs.	A.	P.
Land-revenue	1	1	6
Total revenue	3	11	3

IV.—SANGLI.

The Sangli State, one of the Southern Mahratta jagirs, has an area of 896 square miles, with a population of 223,660 souls.⁹

The area under crops is 315,000 acres, of which 250,000 acres are generally under food-crops.¹⁰

The area under irrigation is about 11,500 acres, and only one-third of this is under food-crops.¹¹

The average assessment per acre on the arable land is¹²—

	Rs.	A.	P.
Garden land	4	0	0
Dry crop land	1	4	0
Rice	5	4	0

¹ Reply of Political Agent to Chapter 1., Question 10.

² *Ibid*, Chapter I., Question 12.

³ *Ibid*, Chapter I., Question 13.

⁴ *Ibid*.

⁵ Reply of Political Agent, Chapter IV., Question 13.

⁶ Bombay Administration Report, 1874-75, Part II., p. 23.

⁷ *Ibid*, 1875-76, Part II., p. 30.

⁸ *Ibid*, 1874-75, Part II., p. 22.

⁹ Bombay Administration Report, 1875-76, Part II., p. 31.

¹⁰ Reply of Mr. W. E. F. Waller, Acting Joint Administrator, and N. G. Despanda, Karbari of the State, to Chapter I., Question 3.

¹¹ *Ibid*, Chapter I., Question 4.

¹² *Ibid*, Question 13.

¹ Bombay Administration Report, 1874-75, Part II., p. 4.

² Reply of Superintendent of Revenue Surveys to Chapter I. (Preliminary).

³ *Ibid*, Chapter I., Question 10.

⁴ *Ibid*, Chapter I.

⁵ *Ibid*, Chapter I., Question 13.

⁶ *Ibid* (Appendix).

⁷ Bombay Administration Report, 1873-74, Part II., p. 50.

⁸ *Ibid*, 1875-76, Part II., p. 11.

⁹ *Ibid*, 1875-76, Part II., p. 27.

¹⁰ Reply of Political Agent to Chapter I., Question 3.

The proportion of Government assessment to the gross produce is estimated at one-tenth.

The total revenues were in—

	Rs.
1874-75 - - - - -	6,81,114 ¹
1875-76 - - - - -	7,50,000 ²
Average - - - - -	7,15,557

This gives an incidence of taxation at Rs. 3-3-2 per head of the population.

V.—MIRAJ.

Another State in the "Southern Mahratta jagirs" is the Miraj State. It has an area of 548 square miles and a population of 117,802.³

The average area under cultivation in this State is 4—

	Acres
Under dry crops - - - - -	147,537
„ garden - - - - -	4,751
„ rice - - - - -	78
Total - - - - -	152,366

Of this total area, about three-fourths are under food-crops.⁵ The area under irrigation (from wells) is 4,751 acres.⁶

The State has been surveyed.⁷ The tenure most common is the ryotwari tenure as known in Bombay, by which the occupants have acquired transferable proprietary rights in the lands held by them. There are also inam tenures.

	Acres.
The extent of lands held on ryotwari tenures is - - - - -	152,366
And the inam are - - - - -	26,819

The general incidence of the land revenue on the cultivated area is for 5—

	Rs. A. P.
Dry crop land - - - - -	1 1 9 per acre.
Irrigated land - - - - -	4 2 8 „
Whole cultivated area - - - - -	1 3 2 „

The proportion of the value of the gross produce to the revenue paid is about as 5 to 1.

The income of the State was in 5—

	Rs.
1875-76 - - - - -	4,33,122

giving an incidence of taxation of Rs. 3-10-9 per head of the population.

VI.—JAMKHANDI.

Jamkhandi is another State among the Southern Mahratta jagirs. Its area is 493 square miles and its population is 102,346.

The average area under cultivation is 217,484 acres: of this 190,975 acres are under food-crops, and the rest is under cotton and other cultivation.¹⁰

The general incidence of land-revenue on the total cultivated area is as follows 11—

	Acres.	Assessment.	Incidence per acre.
		Rs.	Rs A. P.
On irrigated lands - - - - -	3,132	7,873	2 8 0
On dry crop lands - - - - -	214,352	4,72,764	2 3 3
Total - - - - -	217,484	4,80,637	2 3 4

This figure, however, of Rs. 4,80,637 for the assessment does not agree with the statement in the Admin-

istration Report that the actual total revenue of 1875-76 was Rs. 3,80,646, giving a taxation of Rs. 3-11-6 per head.¹

VII.—MUDHOL.

Mudhol is another small State among the jagirs of the Southern Mahratta Country. Its area is 361 square miles and its population is 49,396.²

The area under cultivation is 194,989 acres.³ of this 133,394 acres are under food-crops.⁴ Here also proprietary and occupancy tenures are the most common tenures. The former comprise an area of 151,242 acres, and the latter one of 43,747.

The revenue on the cultivated area is Rs. 1,48,311;⁵ this gives an incidence of Rs. 1-5-1 per acre. The proportion of land-revenue to the cultivated area is one-fourth.

The revenues were in 1875-76 Rs. 2,16,890, giving an incidence of taxation at Rs. 4-6-3 per head.⁶

None of the other States have furnished any replies, and nothing more can be gathered from the Administration Reports available to us. But it may be useful, in considering the subject of assessment rates, to note the evidence given before the Famine Commission⁷ in regard to the Native States by Colonel W. C. Anderson, Survey and Settlement Commissioner. He said—

"In assessing Native States (which my Department does constantly, and at the request of the Chiefs), we most commonly have to put on rates which are higher than those in adjacent British territory by 15 or 20 per cent, in order not to produce a decrease in the Chief's revenue, and to obtain his consent to the settlement. It has constantly happened that the ryots in Native States have resisted the arbitrary assessments of the Chiefs, and have insisted, as a solution of their differences, on a settlement by the Survey Department. The Chief has agreed to this in the end on condition that he did not suffer in revenue. In no case has the settlement diminished the Chief's revenue, rather the contrary, as systematic assessment on land according to its quality will always produce a larger revenue than an unsystematic arbitrary assessment, and at the same time afford material relief to the less influential classes of cultivators who were certain to be suffering severely under such an assessment which was to the sole advantage of the more influential and wealthy classes of landholders. Even though required, under the settlement made, to pay somewhat higher rates of assessment than those in force in adjacent Government territory, the settlement is still to the advantage of the ryot in the Native State, as he thereby acquired security of tenure and freedom from liability to capricious enhancement of taxation."

The Hon'ble Mr. J. Gibbs added his testimony to this when he said in his evidence⁸—

Dated 25th February 1879.

"A comparison between the statistics of assessment of our territories and Native States has led me to the conclusion not only that our assessment is low, but that it is so low as perhaps to affect injuriously the industry and enterprise of the cultivators, leading them to a careless style of cultivation; whereas, if the assessment were heavier, they would try to take more out of the soil than they do now. Dividing the soil of the Deccan into three classes, I think the cultivation of the first class and the greater part of the second is so slovenly, that the soil does not return what it ought. In the lower class of soil the outturn is so small, that careless cultivation is perhaps natural. A revenue officer who had been engaged on a boundary case between the Sangli estate and the Satara boundary told me that he had been struck by seeing land on the Sangli side highly cultivated, while exactly similar land on the Satara side was poorly cultivated. The assessment was found to be (I think) Rs. 1-8 in Sangli, against Rs. 0-10 in Satara."

¹ Bombay Administration Report, 1874-75, Part II., p. 24.

² *Ibid*, 1875-76, Part II., p. 33.

³ *Ibid*, 1875-76, Part II., p. 31.

⁴ Reply of Karbari of Miraj to Chapter I., Question 3.

⁵ *Ibid*, Question 4.

⁶ *Ibid*.

⁷ *Ibid*, Questions 10 and 11.

⁸ *Ibid*, Question 13.

⁹ Bombay Administration Report, 1875-76, Part II., p. 36.

¹⁰ Reply of Narayan Bhikaji, Karbari of Jamkhandi, to Chapter I., Question 3.

¹¹ *Ibid*, Question 13.

¹ Bombay Administration Report, 1875-76, Part II., p. 36.

² Reply of Sadashiva Raghunath, State Karbari, to Chapter I., Question 4.

³ *Ibid*, Chapter I., Question 3.

⁴ *Ibid*, Question 10.

⁵ *Ibid*, Question 13.

⁶ Bombay Administration Report, Part II., p. 36.

⁷ Dated 18th February 1879.

⁸ Dated 25th February 1879.

NIZAM'S TERRITORIES.

The Nizam's territories are divided into two natural portions, the Telingana or Telugu-speaking and the Mahratwari or Mahratti-speaking.

The former lies to the east, and is a country full of tanks, by the help of which much rice is grown; the latter, to the west, is a dry black soil country corresponding to the Deccan of Bombay.

No proper survey having been made as yet, the area of the whole country can only be given approximately from the ordinary assessment records of His Highness's Revenue Department. Taken from this source, the total area is 33,058 4 square miles. The Trigonometrical Survey measurements, however, bring out a figure "very much in excess of this area," and Mr. Mehndi Ali explains the reasons for the difference by saying that the Trigonometrical Survey—

"Includes all hilly surfaces, extensive jungle lands, jagurs, &c, not included in the entries on revenue

records, besides which the figures given in the "assessment records refer only to khalsa land, which "has not been all surveyed. Where surveyed, the "area has been found at least double in Telingana, "and in Mahratwari 10 to 15 per cent. in excess."

In a statement¹ by Major C. B. Euan Smith, First Assistant Resident, the total area is given as 69,364 square miles.

The total population is given in that statement as 4,373,594; the data for this figure are not explained, and Mr Mehndi Ali in his reply² to question 3, Chapter I., of the Famine Commission's enquiries, estimated the present population to be 5,685,700, increasing the above-mentioned figure by 30 per cent.

The following statement shows the cultivated area divided into wet and dry cultivation, and gives the assessment thereon³.—

DIVISIONS.	WET CULTIVATION.			DRY CULTIVATION.			Rate per acre on all cultivation.
	Acres.	Assessment in British Rs.	Rate per acre.	Acres.	Assessment in British Rs.	Rate per acre.	
			Rs. A. P.			Rs. A. P.	Rs. A. P.
Mahratwari - - - -	176,260	9,12,412	5 2 10	8,105,044	78,57,685	0 15 6	1 0 11
Telingana - - - -	358,095	45,68,861	12 12 2	1,824,776	26,21,387	1 6 11	3 4 8
Total - -	534,355	54,81,273	10 4 1	9,929,820	1,04,79,072	1 0 11	2 2 9

These figures show a much larger area than has been given in former returns, and the cultivated area according to them amounts to nearly two acres per head of the population. Regarding the Mahratwari division, Mr. Mehndi Ali considers the figures here given nearly correct, because under the Mogul and Mahratta rules this country was frequently surveyed. But still he thinks that the exact area under cultivation is even greater than this; and he would safely put down the excess at about 15 to 20 per cent. In Telingana the area is still greater, the country never having been surveyed; and he believes that the true area is about 30 per cent. more than is recorded for wet land and 50 per cent. more for dry land.

The following statement shows the difference between the recorded and the actual area in the case of nine villages of the Meduck district which have just been surveyed.

	AREA, IN ACRES.		Assessment in rupees.	RATE PER ACRE.	
	Former.	Present.		Former.	Present.
Dry cultivation -	631	3,111	2,083 8 0	3 3 10	0 10 8
Wet ditto -	356	873	9,850 12 0	27 10 3	11 4 6

It is believed, however, that the error is not generally so great as this. Adopting the ratio mentioned above, the cultivated area will be—

	Acres.
In Mahratwari - - - -	9,522,000
In Telingana - - - -	3,201,000
Total -	12,723,000

or 2·2 acres per head of population.

The ratio is larger than in Bombay, but less than exists in Berar, and it probably is not very far from the truth.

The following statement⁴ shows the average area of cultivated land held by each cultivator and the jama paid by each in the two divisions, as also the average value of produce and the proportion which the revenue bears to the value of the produce. This statement must, however, be taken as subject to the limitations mentioned in the preceding paragraph :—

DIVISIONS.	Number of cultivators.	LAND HELD BY EACH CULTIVATOR, IN ACRES.			AVERAGE ASSESSMENT PER CULTIVATOR IN BRITISH RUPEES.			Average value of produce of each cultivator's holding.	Proportion which revenue bears to produce.
		Dry.	Wet.	Total.	Dry.	Wet.	Total.		
					Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs.	
Telingana - -	175,310	10·4	2·04	12·44	14 15 2	26 1 8	41 0 2	230	17·13
Mahratwari -	267,442	30·3	·64	30·94	29 6 6	3 6 6	32 13 0	309	10·64
Total -	442,752	22·42	1·2	23·62	23 10 8	12 6 1	36 0 9	278	12·96

The assessment is paid in cash, and is levied on the average value of the crops of ten years.² The Bombay system of revenue survey and settlement is being adopted now; it was introduced in the Aurungabad

district in 1875, and is in progress in that district, and in the districts of Nuldrug, Beer, Lingsagar, and Meduck.

¹ Page 23 of Mr. Mehndi Ali's narrative on famine of 1876-77.

² Page xxxv.

³ Mr. Mehndi Ali's replies to Chapter I., of the Famine Commission's enquiries, Question 13.

⁴ Mr. Mehndi Ali's replies to Chapter I., pp. xvii. and xviii

¹ Mr. Mehndi Ali's replies to Mr. Caird's questions.

² Sir Salar Jung's evidence before the Famine Commission, dated 7th February 1879.

Fiscal year.		REVENUE ADMINISTERED BY GOVERNMENT.										Revenue earned out under Amils.		Grand Total.		Actual Receipts.	
		Land-revenue.		Aboliti.		Customs.		Cases.		Miscellaneous.							
A. D.		RS.	A. P.	RS.	A. P.	RS.	A. P.	RS.	A. P.	RS.	A. P.	RS.	A. P.	RS.	A. P.	RS.	A. P.
1263	1853-54	41,08,498	8 0	1,72,725	9 6	4,65,983	7 3	3,14,881	1 8	59,542	0 6	51,21,630	10 11	23,60,161	8 3	74,81,792	3 2
1268	1858-59	78,65,619	4 9	5,13,945	7 6	5,99,990	1 0	16,90,141	7 0	1,15,385	3 0	1,07,85,081	7 3	1,27,061	15 3	1,09,12,143	6 6
1273	1863-64	1,17,44,513	7 4	9,25,413	9 6	14,29,728	14 0	18,05,843	8 11	4,09,671	4 3	1,63,15,170	12 0	25,194	13 6	1,63,40,365	9 6
1278	1868-69	1,34,97,382	13 10	21,60,320	14 8	30,97,016	1 6	19,45,136	15 6	10,69,791	1 8	2,17,69,647	15 3	767	6 0	2,17,70,415	5 3
1279	1869-70	1,48,98,315	9 11	22,80,082	5 8	31,88,971	5 9	19,35,411	5 8	11,23,937	6 4	2,34,26,668	1 4	767	6 0	2,34,27,435	7 4
Average -		1,04,22,865	15 2	12,10,487	9 4	17,56,337	14 8	15,38,282	14 2	5,55,665	6 4	2,54,83,639	12 6	5,02,790	9 9	1,59,86,430	6 4
1280	1870-71	1,39,15,897	3 4	23,44,880	1 8	26,53,485	15 8	18,75,226	2 5	11,20,936	12 1	2,19,10,426	3 2	767	6 0	2,19,11,193	9 2
1281	1871-72	1,48,36,205	4 9	26,04,283	3 2	24,69,160	0 5	22,66,203	6 10	5,56,384	9 4	2,27,32,236	8 6	767	6 0	2,27,33,003	14 6
1282	1872-73	1,74,76,070	7 3	27,08,414	6 6	28,02,262	0 0	25,51,002	2 8	6,38,751	2 10	2,61,76,500	3 3	767	6 0	2,61,77,267	9 3
1283	1873-74	1,63,89,815	1 3	27,53,979	7 2	28,04,727	7 3	24,08,476	1 2	6,61,716	6 0	2,50,18,714	6 10	767	6 0	2,50,19,481	12 10
1284	1874-75	1,84,19,250	3 2	28,57,570	14 2	28,02,262	0 0	13,16,552	1 7	5,81,200	15 7	2,59,76,636	2 6	697	9 10	2,59,77,333	12 4
Average -		1,62,07,447	10 4	26,53,325	9 9	27,06,379	7 10	20,83,451	15 9	7,11,797	15 7	2,43,62,902	11 3	753	6 9	2,43,63,656	2 0
																2,33,56,104	7 10

Cultivation has increased steadily in the Mahratwari division, as will be seen from the following statement¹ :—

FASLI.	Calendar year.	CULTIVATED AREA, IN ACRES.		
		Wet.	Dry.	Total.
1280 - -	1870	135,647	6,548,971	6,684,618
1281 - -	1871	153,241	7,009,543	7,162,784
1282 - -	1872	177,219	7,145,619	7,322,838
1283 - -	1873	181,681	7,246,287	7,427,968
1284 - -	1874	176,260	8,105,044	8,281,304
Increase in the area of 1874 over that of 1870 - - -		40,613	1,556,073	1,596,686
Percentage of increase		30	24	24

A similar statement for the Telingana division has not been furnished, because, for the reason already explained, equal reliance cannot be placed on the figures given for those districts.

The revenues² have also largely increased, as will be seen from the opposite statement, (p. 84.) which excludes, "the surplus derived from Berar, from jagir villages

temporarily attached by the order of Government, and the revenues derived from the Sarf-i-khas talukas, &c."

Thus we find that while in 1854—

The land revenue was - - Rs. 41,08,498
And the total revenues were - - " 74,81,792
In 1869 the land revenue was - - " 1,48,98,315
And the total revenues were - - " 2,34,27,435

And that the average for this period comes out—

For land-revenue - - - Rs. 1,04,22,865
And for total revenues - - - " 1,59,86,430

Following the years down, we find that while in 1870—

The land-revenue was - - Rs. 1,30,15,897
And the total revenues were - - " 2,19,11,193
In 1874 the land-revenue was - - " 1,84,19,250
And the total revenues were - - " 2,59,77,333

The average for these five years being—

For land-revenue - - - Rs. 1,62,07,447
And total revenues - - - " 2,43,63,656

Now, if we take the total population of the Nizam's territories to be 5,680,000 in round numbers, we find the following results showing the incidence of taxation:—

Years.	Land-Revenue.	Incidence per Head.	Total Revenue.	Incidence per Head.
	Rs.	Rs. A. P.	Rs.	Rs. A. P.
1870 - -	1,30,15,897	2 7 2	2,19,11,193	3 13 8
1874 - -	1,84,19,250	3 3 11	2,59,77,333	4 0 2

TRAVANCORE.

The area of the Travancore State was computed by the Trigonometrical Survey to be 6,653½ square miles;³ but in the Madras Administration Report⁴ of 1876-77 the area is said to be 6,730 square miles, divided into 32 taluks. The data for this figure are, however, not mentioned.

In 1854 a census of the State was taken,⁵ which showed a population of 1,262,647. In 1875 another census was taken.⁶ The operations lasted about four months. The rules and arrangements for this census were nearly the same as those adopted in British India. There was first a registration of houses, and then a registration of shops, pagodas, mosques, schools, &c. This was followed by a preliminary house-to-house enumeration, occupying thirty days; and finally, there was a synchronous enumeration of the population of the whole State in one day, the 18th May. Twelve thousand enumerators were employed. The report on the result of this census contains minute information treated generally under the heads adopted for the Madras census of 1871.⁷ The total population thus ascertained is 2,311,379. The average population per square mile is 343·44; it is densest near the sea-board taluks, where it rises from 476 to 1,279 to the square mile.

There have been several surveys of the land carried out from remote dates.⁸ The surveys on which the present revenue arrangements are based are those of the year 1773 A.D.:—

" This was a very comprehensive one, and embraced nearly the whole of the lands, gardens, and paddy-fields, now belonging to the State. There have, however, been subsequent surveys. No idea is afforded by ayacut (survey) accounts of the whole extent of paddy-lands, but those which come under assessment consist of 3,181,620 paraus of land, or about 400,000 acres at 8 paraus per acre, assessed with a net revenue, after making all deductions, of Rs. 8,08,958

" (which is about half the total land-revenue, or Rs. 2 per acre). It is impossible to say that the ayacut rates of assessment on paddy-lands have been fixed on a uniform plan or principle, but a very minute local appraisement by arbiters and sirkar officers seems to have preceded the operation of classification. Each field expressed by the quantity of seed it took to sow was rated at so many paraus of produce, and commonly expressed as double, treble, quadruple, &c. North of Trevandrum the average rate of rent was about double the seed. In the south it went up to beyond ten times, but the average was probably five times, and in recent years all excessive rates above ten were reduced to that level. The average gross produce in the north may be put at between seven and eight times, and that in the south at between twelve to fifteen times the amount of seed. The sirkar's share is thus about a fourth in the one case and a third in the other.

" The above are the standard pattom rates on the lands. There are, however, various other extra cesses, about 200 in number, corresponding to the abwabs of north India, collected over and above the standard rates. They amount to Rs. 60,000, and are met with in all taluks.

" The taxes on gardens are collected in money, with a few exceptions. The tax on paddy-land is collected part in grain and part in money, according to the wants of the sirkar with reference to neighbouring temples and charity-feeding institutions. The proportion may be stated as a third in grain and two-thirds in money. All grain received in kind, but found in excess of sirkar's wants, is commuted into a money payment at varying rates. For gardens, ten equal kists are required, and for paddy four kists for each crop. Only two instalments, however, are allowed for the portion payable in money."

There are no statistics available showing the cultivated area.

The total average revenues of the State in the five years from 1870-71 to 1874-75¹ were Rs. 51,42,648, after excluding "Interest on Government securities," which the State seems to include² in its accounts of revenue derived from the land and the people. The following statement shows the revenues of the three following

¹ Maclean's Standing Information, p. 55.

² The total amount of interest during the five years was Rs. 6,84,210.

¹ Mr. Mehndi Ali's replies to Chapter I., p. xv.

² *Ibid.* pp. xxiv and xxv.

³ Madras Administration Report, 1875-76, Part II., p. 18.

⁴ *Ibid.* Part II., p. 7.

⁵ *Ibid.* 1876-77, Part II., p. 7, also.

⁶ "Standing information regarding Official Administration in Madras Presidency," by C. D. Maclean, p. 31.

⁷ Madras Administration Report, 1876-77, Part II., p. 7.

⁸ Maclean's Standing Information, pp. 45, 46.

years in detail. I have set apart the interest on securities:—

	*	†	‡
	1875-76	1876-77.	1877-78.
	Rs.	Rs.	Rs.
Land-revenue -	16,97,766	16,18,581	17,27,507
Miscellaneous revenue -	6,23,434	5,93,411	7,04,883
Judicial fees, &c. -	1,43,217	1,62,122	2,27,997
Customs -	4,12,804	3,98,050	4,13,635
Arrak and opium -	1,57,978	1,69,112	1,72,357
Tobacco (import duty) -	9,14,303	9,22,276	8,38,486
Salt (a Government monopoly, sold at Rs. 2 per maund) -	10,81,592	11,24,820	13,82,490
Cardamoms and other goods -	1,72,897	2,56,090	2,57,405
Forest income (net) -	1,01,851	1,00,779	1,13,513
Arrears of revenue collected -	78,580	81,395	51,502
Total -	53,84,422	54,26,636	58,89,775
Interest on Government securities -	1,47,217	1,65,246	88,246
TOTAL -	55,31,639	55,91,882	59,78,021

* Madras Administration Report, 1875-76, Part II, p. 29.

† *Ibid*, 1876-77, Part II, p. 11.

‡ Travancore Administration Report, 1877-78, p. 140.

These totals give an average of Rs. 55,66,944 for the three years, excluding of course the interest from cash balances. Taking the population to be as stated above, 2,311,579, this gives an incidence of taxation at Rs. 2-6-6 per head. The incidence of land revenue would be Rs. 0-11-7 per head calculated on the average of the three years' revenue.

The item of "miscellaneous revenue" given in the above statement¹ comprises receipts derived from a great variety of sources, and they are of a fluctuating character. The figures of the chief items were for the two last years as follows:—

	1876-77.	1877-78.
	Rs.	Rs.
1. Out of pagoda offering boxes -	3,802	4,301
2. Ordinary receipts from pagodas -	14,772	12,955
3. Revenue fines levied on revenue servants -	16,426	15,258
4. Postal collections (unjell) -	16,124	17,473
5. Sale-proceeds of book depôt -	18,533	20,971
6. Fees on transfers of pantom lands -	44,188	50,995
7. Sales of sirkar lands or rights including saltpans -	21,705	22,104
8. Registration fees -	1,10,470	1,19,111
9. Sales of surplus paddy; difference between market and commutation price -	62,441	1,45,899
10. Receipts from school fees -	19,352	20,969
11. Grazing fees, Cardamom hill -	4,542	—
12. Surplus credited from Sree Paudaravagay -	39,646	34,944
13. Magisterial fines -	28,907	28,388
14. Recoveries of outstanding cash advances -	46,721	75,341

¹ Travancore Administration Report, 1877-78, p. 3.

	1876-77. Rs.	1877-8. Rs.
15. Balance out of preceding year's sales of lands for coffee cultivation -	13,700	6,666
16. Coals from Cooluthoay bridge -	7,381	6,238
17. Receipts from goat transit -	8,998	9,115
Total -	4,77,708	5,90,728
Undefined balance -	1,15,703	1,14,155
Total miscellaneous revenue -	5,93,411	7,04,883

It has been seen from the foregoing paragraphs that the incidence of revenue per cultivated acre can only be ascertained in 12 States. The following table is an attempt to compare that incidence with the incidence in adjoining British provinces:—

NATIVE STATES.	Incidence per cultivated acre.	British provinces adjoining.	Rate per cultivated acre.*
	Rs. A. P.		Rs. A. P.
Rajputana—			
Udaipur -	4 0 2	Punjab N. W. P. Oudh C. Provinces	0 15 0 1 10 10 1 12 0 0 6 3
Alwar (†) -	1 6 11		
Bhartpur -	2 10 1		
Dholpur -	3 6 1		
Bundi -	1 12 7		
Kapurthala -	3 10 11	Bombay	1 4 4
Bombay States—			
Bhaunagar -	3 3 0		
Kolhapur -	1 15 0		
Miraj -	1 3 2		
Mudhol -	1 5 1	Berar Madras	0 15 1 1 11 4
Nizam's Territories -	2 2 9		
Travancore -	2 0 0		

* Mr. Elliott's draft of Chapter I, Sections 16 and 17 of Report.

† This rate should be increased, as it is obtained by dividing the revenue by the area of fiscal villages only, the area of the rest being unknown.

Another comparison of the rates may be made by calculating the incidence per head of population thus:—

NATIVE STATES.	Incidence of land revenue per head of population.	British provinces adjoining.	Incidence of land-revenue per head of population.*
	Rs. A. P.		Rs. A. P.
Rajputana—			
Udaipur -	1 1 4	Punjab N. W. P. Including water-rate Excluding water-rate Oudh	1 2 2 1 7 0 1 5 1 1 0 5
Alwar -	2 6 5		
Bhartpur -	2 13 2		
Dholpur -	2 15 8		
Bundi -	3 13 9		
Central India—		Bombay Madras— Including water-rate Excluding water-rate	1 11 6 1 0 7 1 0 0
Gwahor -	3 8 7		
Rewah -	3 0 1		
Kapurthala -	3 5 8		
Bombay States—			
Kolhapur -	1 1 6	Bombay	1 11 6
Mudhol -	3 0 0		
Nizam's Territories -	3 3 11		
Travancore -	0 11 7		

* Mr. Bernard's calculation, p. 14 of Blue-book, Part IV.

L. L.—30-9-79.

REPORT ON THE USE OF CARROTS AND OTHER ROOT CROPS BY THE AGRICULTURAL POPULATION OF THE NORTH-WESTERN PROVINCES DURING TIMES OF SCARCITY.

By Mr. E. C. Buck, Director of Agriculture and Commerce, N.-W. P. and Oudh, 16th October 1878.

In the half-yearly agricultural report in the North-Western Provinces, published in the local Gazette of September last, I adverted to the extension of carrot cultivation which had taken place in consequence of the failure of the kharif in 1877, and promised a further report, which I now supply for the information of the Famine Commission. As my Head Superintendent has taken much personal interest in the enquiry, I append the greater part of his note in original.

2 In a demi-official letter of 23rd January, 1878, I was permitted by Government to make detailed enquiries through kanungos, and their replies corroborate the ideas which had been formed of the reliance placed by the agricultural population upon carrots, and to a less extent upon radishes, under a failure of the ordinary autumn harvest. The reason is simple. When the kharif grain crops fail and food stocks are reduced to a low ebb, the people have little to depend upon for food, unless purchased at a ruinous price, until March, when the spring harvests are gathered in. But carrots and radishes can be raised in a hurry, and being sown in September or October, supplement the food supply in the winter months at a time when scarcity is greatest.

3. There are other advantages in the cultivation of these crops which recommend them. One is that a large weight can be produced from a small area. Another is that irrigation, which cannot be easily spread over a large extent in a year of drought, is concentrated on a minimum space and can be utilized to its maximum power.

4. The facts gleaned by the enquiries are that in the upper portions of the provinces, where the failure of the kharif was greatest, the cultivation of carrots rose to three or four times the ordinary extent, and would have increased much more had seed been obtainable. The price of seed rose from Rs. 7 or 8 a maund to Rs. 30 or 40 a maund, and in some instances to a very much higher rate, especially in the Central Doab, where the price ranged above Rs. 50.

5. There is no doubt whatever that the carrot crop fed thousands of the starving poor. It was impossible for me to ask the Revenue staff to ascertain (under the pressure of so many other duties) the acreage raised, so that I cannot estimate what quantities were grown, but I shall obtain a return this year of the ordinary acreage under carrots, which will give some clue for the future. It has been shown by my Head Superintendent in his note that, allowing four seers a head per diem, the carrots of an acre of land would support 10 persons for 200 days, could they eat carrots alone. Carrots must, however, be supplemented by some grain, but it may be presumed that a supply of grain (the outturn of about two acres) sufficient for 10 persons for 200 days could be made to satisfy 20 persons for the same time if supplemented with the outturn of an acre of carrots¹.

The above estimate is framed on the estimate of an outturn of 200 maunds an acre, which is much below the possible maximum, an outturn of over 300 maunds an acre not being uncommon, in addition to about 50 to 100 maunds of nourishing fodder for cattle. The English outturns run up to 20 or 30 tons, or from 500 to 700 maunds an acre.

6. I have been asked by some officers why enquiries were instituted about well-known facts, but I am not sure that the facts have been sufficiently appreciated, or are sufficiently well known in all parts of the province. I was informed (I believe by Mr. Elliot Colvin, the Commissioner of Meerut) that it was in the year of

scarcity, 1869, that the Rohilkhand population first took the idea extensively from the cultivation of the Meerut side, and I am convinced from private enquiry that the practice is less common in the south than in the north of the provinces.

7. There is another crop which possesses the same advantage of being able to furnish a good supply in the most critical months,—I refer to the potato, the cultivation of which is still very far from general, although fast extending. The price of potatoes for seed, however, went up with a run as in the case of carrot seed, and they fetched much above the ordinary rate throughout the province. I have often seen on latrine manured land from 200 to 300 maunds per acre raised, in addition to radishes and other plants on the same ground, but on ordinary land it is probably from 100 to 150 maunds. I am not sure what quantity of potatoes would suffice for one man per diem, but I read that 1lb. of wheat is considered equivalent to 6lbs. of potatoes, so that an acre of potatoes would perhaps not go so far as an acre of carrots. The potato also labours under the disadvantage of being less portable for planting purposes than carrot seed.

8 The principal deduction which I wish to draw from the statements now submitted is, that, in the event of the failure of a kharif crop, it may be possible to expend funds for famine relief in the most economical way by procuring seed for crops which can raise a food supply in the months intervening between the autumn and spring harvests. This method of famine relief has two advantages: in the first place it increases the food supplies; in the second place it gives remunerative work to the agricultural population who will always perform the hardest labour on their own land. Both these results might be secured by Government, at a comparatively small outlay, by selling seed either to the people themselves, or to the grain dealers of the province who would retail the seed to cultivators. There would be no fear of any of it being kept back, and as cultivators reap a profit by raising food when food is at a famine price, there would be no occasion to distribute it gratis to the agricultural classes at the expense of the rest of the population.

9. If, instead of importing shiploads and trainloads of food grains, Government were able at a critical time to import a shipload of field carrot seed, it might be found that a thousand rupees in the latter case would go as far as ten thousand in the former. The following are the statistics which may be taken into consideration:—

8lb. of seed are considered sufficient in England for an acre of carrots. 10lb. (or five seers) is the estimate given by my superintendent, and I would keep to it, as the market garden cultivation of the native requires a greater quantity of seed than field cultivation in England.

The price of field seed is about two shillings a pound, and I have no doubt that large quantities could be obtained for much less than a rupee a pound. Assuming that carriage costs one-fourth of the cost of seed (a very high estimate), Rs. 1,000 would purchase and bring to its destination more than 800lbs. of seed, which would supply more than 100 acres of carrots, giving an outturn, at 200 maunds an acre, of 20,000 maunds of carrots. Assuming that carrots are five times less nourishing than grain, this would be equivalent to 4,000 maunds of grain, which would not cost less than Rs. 10,000.

10. But, as I have said before, seed could be sold, and ought not to fetch less than 8 annas to 12 annas a seer, so that nearly, if not quite half, the outlay on seed might be recovered. The produce raised from the seed would be due only in small part to the Rs. 500 or 600 spent by Government, since it would be chiefly owing to the agricultural labour on cultivation. This is the point which commends the suggestion. It is a system which by a small initial outlay provides labour to the agricultural population, with the result of increasing their food supply by an amount which would

¹ The following is the composition of dried carrot given in Chambers's Encyclopædia:—

Starch and sugar	-	-	93 71
Albumen	-	-	4 35
Red neutral substance (carotin)	-	-	0 34
Fixed and volatile oil	-	-	1 00
Ash-	-	-	0 60
Total	-	-	100 000

not otherwise be forthcoming. In many cases those very persons who raise the food might otherwise be thrown on the country for relief, and although I cannot assume that the whole of the Rs. 10,000 which the grain equivalent would cost would fall upon Government, yet there is no doubt that the increased supply of food would save them a good deal more than the Rs. 500 or 600 spent upon seed.

11. The question, however, requires further sifting. In the first place, no order for seed can be given until the failure of the kharif is pretty well assured. This may be settled perhaps as early as the 15th September, and carrot-sowing can go on until 15th November. I am writing of the North-Western Provinces. Can a telegram bring out seed in time? Will the English field seed suit the climate? Will it stand the voyage? And can fresh seed be supplied in September? What is the price for large quantities? Will it be cheaper to grow seed annually in this country in preparation for an emergency? How far will the people be willing to extend carrot cultivation? Can field carrot seed be obtained nearer India, from the Mediterranean countries or elsewhere? These questions ought to be settled, and to some extent I shall have the opportunity myself of working out the answers to them, and intend to do so.

12. The results of the investigation into carrot culti-

vation as a famine crop lead to the question whether other root crops, such as mangel wurzel and turnip, might not be found of similar utility. Half the quantity of seed (at the same price as carrot seed) is required per acre, and the outturn in weight at home is much greater than of carrots or potatoes. The disadvantage in their case is that the people are not yet educated to their use, and I doubt if much more can be done, for some time, than to endeavour to introduce their cultivation with the view of eventually increasing the food supply in what I may call the intermediate months. I have raised a good crop of mangel wurzel with canal water, but neither people nor cattle seemed to care about eating them, though they would probably be glad to do so in a famine year. But these facts indicate that it will be safer for some time to come to place most reliance upon what the people themselves understand, viz., the cultivation of carrots.

13. I have said little about radishes, partly because they are less important, and partly because the arguments which apply to carrots apply *mutatis mutandis* to radishes. It will be easy to adopt the same system for one as for the other.

14. I suggest, if the local committee consider the subject of sufficient importance, that these papers be printed and submitted to the Central Famine Commission.

III.—AGRICULTURAL TRAINING.

No. 1.

EXTRACT FROM THE PROCEEDINGS OF THE GOVERNMENT OF INDIA, IN THE DEPARTMENT OF REVENUE, AGRICULTURE, AND COMMERCE, DATED CALCUTTA, THE 4TH FEBRUARY 1879.

[AGRICULTURE AND HORTICULTURE.]

READ—

Despatch from the Secretary of State, dated 4th February 1878, No. 29 (Statistics and Commerce)
 Letter to the Governments of Madras, Bombay, and the North-Western Provinces of Oudh, and to the Chief Commissioners of the Central Provinces, British Burma, and Mysore, Nos. 97—102, dated the 21st March, 1878.
 Letter from the Chief Commissioner of Mysore, No. 196—J.R., dated 11th April 1878.
 Letter from the Chief Commissioner of British Burma, No. 707—269, dated the 11th April 1878.
 Letter from the Government of the North-Western Provinces and Oudh, No. 1358A., dated the 20th of May 1878, and enclosure.

Letter from the Government of Bombay, No. 3066, dated 17th June 1878.
 Letter from the Chief Commissioner of the Central Provinces, No. 2868—136, dated the 22nd July 1878, and enclosures.
 Letter from the Government of Madras, No. 1425, dated the 4th September 1878, and enclosures.

Read also—

Letter from the Government of Bengal, No. 584, dated the 23rd February, 1877.
 Letter to the Government of Bengal, No. 91, dated the 4th May 1877.
 Letter from the Government of Bengal, No. 1595, dated 26th May 1877.

OBSERVATIONS.

1. In his despatch dated the 7th February 1878, the Secretary of State noticed an experiment at the Nagpur Model Farm in 1876-77, where in consequence of irrigation and manuring, Jelalia wheat produced 1,600lbs., and white-eared wheat 2,200lbs. per acre, the average yield per acre in the country being only about 400lbs. The value of the produce at Nagpur was estimated at Rs. 60, while the cost of cultivation, including all expenses, was given at Rs. 10 per acre. His lordship desired to be informed "what steps are taken in the above and other provinces to impart to the agricultural community generally the lessons to be learnt from the operations of the model and experimental farms;" and observed, "as in many cases these farms appear to involve financial loss, it is the more important that their results, when satisfactory, should be utilized to the utmost for the general good of the country."

2. A copy of this despatch was circulated on the 21st March 1878, to the Governments of Madras, Bombay, and the North-Western Provinces and Oudh, and to the Chief Commissioners of the Central Provinces, British Burma, and Mysore, with a request for a report in connection with the farms maintained under their orders.

3. In Mysore, the Chief Commissioner states that no general steps have hitherto been taken in the direction indicated, the condition of the province during the past two or three years having forbidden any such measures. Mr. Harman, the Superintendent of the Bangalore Farm, has recently been authorized to make tours in the province twice in the year, once in the summer when the crops are being sown, and again during the winter months when the crops are being reaped, in view to his acquiring practical experience in the native systems of agriculture and imparting to the ryots by personal communication and by experiments the benefits of deep ploughing, as also the advantages to be gained by the use of improved seed. The Chief Commissioner has also under consideration a scheme for placing one or two plots of land in each district under the charge of a village Patel or other suitable person, who would cultivate the land in accordance with instructions from Mr. Harman. "By this means," the Chief Commissioner observes, "it is hoped that the ryots will have an opportunity, which the location of the Government Farm at Bangalore does not afford them, of judging of the results to be obtained by a better system of farming." Since these remarks were written, however, it has been decided to abolish the Bangalore Farm and to transfer the services of Mr. Harman to the Bombay Presidency.

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4. In Burmah, the only Government Farm is one established at Myonktoung in the Arakan Hill Tracts for the purpose of growing and curing tobacco. As regards the cultivation of tobacco on the low lands lying along the banks of rivers, the natives have but little to learn: the farm was started with a view of testing the capabilities of soil in up-land tracts, and more especially for the purpose of teaching the people an improved method of curing the leaf; but there has not been time to judge of the results as yet.

5. Mr. Buck, Director of Agriculture and Commerce, North-Western Provinces and Oudh, in reporting on the subject, refers to that portion of the minute recorded by Sir John Strachey in November 1874, proposing the formation of a Department of Agriculture in the North-Western Provinces, in which it was suggested that a good means of reaching the agricultural community would be by experiments in the estates under the Court of Wards. This suggestion, it is said, has been carried into effect, though not to so great an extent as was desired, in consequence of the drought of 1877. To some estates, however, improved English ploughs, improved sugar-mills, and selected seeds, were sent; and in some districts, where the local officers took an interest in agricultural matters, seed and implements were distributed to estates other than those administered by the Court of Wards. As a further means of introducing improvements to the notice of the agriculturists, Mr. Buck lays great stress on the advantages of agricultural fairs; and he proposes to give greater encouragement to such fairs in future years. No attempts seem to be made by the Local Government to bring directly to the notice of the natives the results of the experiments conducted on the State Farms.

6. There are two Government Farms in the Bombay Presidency, one at Bhadgaon in Khandesh and the other at Salaru in Sind. At Salaru, nothing has as yet been done in the desired direction; but the Superintendent proposed making a tour in the cold weather months, during which he would acquire and diffuse useful information. He is to report the results of his first tour, in order that the Government of Bombay may be in a position to judge of the desirability of repeating the experiment.

At Bhadgaon, too, little appears to have been attempted. The Superintendent reports that instruction is imparted through farm apprentices, farm servants and visitors. The system of apprentices, if carefully worked, would no doubt prove useful; but nothing can be expected from farm servants as a means

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of imparting agricultural information to the native community. Mr Stormont, the Superintendent, recently visited Madras and Bangalore, under authority from the Government of Bombay, with a view to ascertain the system followed on the farms at those places; and he was instructed to report the result of his enquiries on his return to Khandesh.

The Local Government has also, after consultation with Mr. Robertson of the Sydapet Farm, decided on commencing a system of agricultural education in the Deccan, and probably, in due course, the Bhadgaon Farm will be made subsidiary to the scheme of instruction.

7. In the Central Provinces, Major Macdougall, the Superintendent of the Nagpur Farm, proposes to publish the results of "any decidedly successful experiment" in the Rural Gazette, a paper printed in Hindi, Mahrathi, and Erdu by the Educational Department, of which a copy is sent to every Government School in the Central Provinces. The Chief Commissioner approves of this proposal; but such a means of making known the operations of the farm seems scarcely to be what is required, the record of these experiments being useful to the agricultural community only when they can be followed and explained on the farm on which they have been tried.

8. In the Madras Presidency, good and useful work is being done under the supervision and guidance of Mr. Robertson, the superintendent of Government Farms. Attached to the Sydapet Farm on which experiments of various kinds are tried, is an Agricultural College, in which a complete course of agricultural instruction is afforded, and which is intended eventually to accommodate upwards of one hundred students. In view to a further diffusion of information, Mr Robertson has proposed the establishment of small agricultural experimental stations all over the Presidency, each being placed in charge of a trained agriculturist, who is also to conduct an elementary agricultural class. This scheme is, however, at present in abeyance for want of funds.

Recently, a very interesting ploughing competition was held at the Sydapet Farm, in which European, American, and native ploughs were used, the competitors as well as the visitors from different parts of the country being very numerous. Such open competitions as these afford an efficient means of interesting neighbouring cultivators in the methods and processes of the improved system of agriculture practised on the farm. The public reports shew that the exhibition was watched with very great interest and was completely successful.

9. From the facts summarised above, it may be said generally that only in the North-Western Provinces and Madras is any real effort being made to teach agricultural reform to the people. In the North-Western Provinces, a Department of Agriculture and Commerce has been created, with a Director at its head, whose special duty it is to organise the collection of agricultural and commercial statistics; to direct experiments for agricultural improvement in model farms and elsewhere; to watch and report on the progress of trade, and to suggest in what directions it may be developed, or hindrances to its prosperity removed; and to investigate facts connected with the condition of the agricultural classes. The scope and objects of the Department are clearly explained in a minute recorded by Sir John Strachey in November 1874, to which the attention of the Local Governments and Administrations was drawn in the letter from this Department dated the 11th August 1875, Nos 11—426-433, regarding the collection of agricultural statistics.

In Madras there is a Department, which, though not as yet formally recognised as a Department of Agriculture, is practically one, with an efficient and well qualified director at its head; but its expansion has hitherto been greatly impeded by various causes, not the least among which has been the want of funds.

10. In other provinces very little is being done, nor as matters stand can much be expected. Experimental farms indeed, when they stand alone, are of comparatively small utility. To be really useful they should be part of a system of agricultural instruction; they should be attached to a school where sound agricultural instruction is conveyed in class, and they should be the field for carrying into practice in the presence of students the theories of which the reasons have been explained to them in the class-room. If the students are taken from the classes dependent on the land for

their living, satisfactory progress in the diffusion of agricultural instruction under such a system will soon be apparent. It is with much satisfaction that the Government of India has watched the recognition of these principles in Madras and the efforts that are being made there gradually to mature a complete system for their application in practice. The scheme for action in the same direction which has just been proposed by His Excellency the Governor of Bombay is also gratifying as indicating the interest taken in the matter by the Government of that Presidency. In other provinces much cannot be expected under the present system, though, defective as it is, the farms, if they are carefully and intelligently managed, intelligently supervised, and placed on a substantial and permanent basis, must gradually do good, and the Government of India desire again to commend the subject very earnestly to the attention of Local Governments and Administrations. Bengal especially is a province which is singularly deficient in opportunities for agricultural instruction, while it is perhaps of all Indian provinces the one where a reform of practice is most needed. It is also the province of whose agricultural resources and capacities the governing body knows least. It is a matter of more than ordinary importance that the cultivating and wealthy land-owning community in this great province should be taught to realise the advantages of a better agricultural practice, and that steps should be taken to remove the reproach which now exists that the very elements of agricultural information, such as the average yield of particular crops in particular soils, are wholly absent. Efforts in this direction were made some years ago by Sir George Campbell; but these efforts, though well intentioned, were frustrated by radical errors in the selection of sites for farms, as well as in the selection of superintendents. The results were so unsatisfactory that the farms were broken up one after the other, the last being abolished in 1877, on the ground that all the attempts which had been made to teach agriculture to the people of the country had ended in failure. This conclusion was not accepted by the Government of India, and it is desirable in connection with the present question that the views then expressed to the Government of Bengal should be brought prominently before other Local Governments and Administrations. In the letter from the Government of India to the Government of Bengal dated the 4th May 1877, No. 91, it was said:—

"His Excellency in Council is by no means prepared to admit that, because it is not necessary at present to teach to the natives on a scientific basis all the technicalities of the highest farming, there is therefore no opening for instruction of a highly useful, if of a more modest kind, adapted to the present educational and agricultural standard of the country. His Excellency in Council is unable to agree with His Honour the Lieutenant-Governor in the opinion that the attempts of the Government to teach agriculture to the people have failed everywhere. Where these attempts have failed, as at Poosah, failure has been the result of inefficient management; but where ordinary care and attention have been intelligently given to the subject, it is unquestionable that, as at Sydapet in the Madras Presidency for instance, good results have ensued.

"5. It is not necessary to employ specially qualified agricultural chemists for the purposes contemplated by Government in the establishment of model or experimental farms. The objects of the Government have been frequently stated, but they have been well and briefly summarised by Sir John Strachey in the following extract from his Minute of the 28th November 1874, proposing the creation of a Department of Agriculture and Commerce in the North-Western Provinces:—

"The object of these model farms should be three-fold: first, to obtain complete information, based on actual facts, as to the average productiveness of different crops on the different classes of soil on which they are ordinarily cultivated, and the cost of cultivation; secondly, to establish and prove to the native agriculturalists the advantages to be gained from small improvements, such as they are able themselves to carry out under existing conditions, such as deeper ploughing, economical use of canal water, selection of seed, &c.; thirdly, to make experiments as to staples and industries which it may be possible to introduce if new, or to familiarise and improve if already existing in the

"country. The extension of sericulture, the improvement of indigenous fibres, and the manufacture of a finer class of tobacco, may be mentioned among the objects of such experiments."

"It is to these objects that attention should be particularly directed. It is evident that lessons in such matters, especially under the second head, and instructions in such details (important though they are) as the proper storage and application of the manures ordinarily employed in the country, shewing experimentally how they may be made to retain all their fertilising elements, of which much is now wasted, the proper treatment and breeding of live stock, the improvement of the implements employed, and other similar matters, may as successfully be imparted by an energetic man of fair intelligence, possessing an adequate practical knowledge of modern farming (and consequently having such knowledge of agricultural chemistry as is essential to the successful pursuit of modern farming), as by a professional chemist of high scientific attainments."

"The Governor General in Council is convinced that lessons of this kind are urgently needed, and that if measures for the elementary instruction in such matters of the agricultural community are persevered in by the Local Governments (without whose cordial co-operation nothing can be done), they cannot fail after a reasonable time to have very considerable effect upon the cultivators in the neighbourhood for the Government farm and through them upon others further away."

11. The excellent results which have followed the

creation of a Department of Agriculture, and Commerce, in the North-Western Provinces, in the impulse which has been given by it to agricultural enquiry and improvements, indicate perhaps the best form in which Government action can be directed to the promotion of the objects in view. With the establishment of such a Department in each province (and it is maintained in the North-Western Provinces entirely from provincial funds) the extension of the system, whether by agricultural instruction in schools, or by practical teaching in experimental farms, or where means are available by a combination of both, could be regulated under efficient control and advice according to the particular requirements or circumstances of each province. From this point of view the Governor-General in Council will be glad to learn that the matter has again received from the Government of Bengal and other Local Governments and Administrations the consideration which its importance merits, and he would wish to be informed at an early date of the results of that consideration.

ORDER.—Ordered, that the above Resolution be communicated for information and guidance to the Local Governments and Administrations and for information to the Secretary of State for India.

ORDERED also, that a copy, with a copy of the letter from the Government of Madras, dated the 4th September 1878, No. 1425, and enclosures, be forwarded to the Famine Commission, and that the Resolution be published in the Supplement to the Gazette of India.

NOTE ON AGRICULTURAL TRAINING FOR CIVILIANS, BY MR. C. L. TUPPER.

In the concluding paragraph of his Minute on Agriculture in Bengal, the Hon'ble Sir John Strachey observes:—

"There might be no great difficulty in carrying out the suggestion that a certain number of young civilians should, after passing their examinations in England, go through a course of instruction at some suitable place of agricultural education. I should like to ask the Famine Commission to consider this subject, in the hope that the practical experience of Mr Caird, and the knowledge that he possesses of Indian and English agriculture, might teach us how the suggestion could be acted on."

The papers are officially before the Famine Commission; but meanwhile I have obtained permission to make a few remarks on the subject.

The aim is to recruit the Civil Service with men who possess some real scientific training in agriculture. Four separate methods in which this might be done have either occurred to me or have been suggested to me by others.

The first is that which Sir John Strachey appears to contemplate. After the conclusion of the two years' course in England, the selected candidate might study for a further period at an Agricultural College either in England or on the Continent.

Secondly, theoretical and perhaps also practical agriculture might be included in the list of subjects to be taken up at the open competition. Candidates might obtain marks in Agriculture as they do in Classics or Mathematics or Natural Science. By this means a few men might be obtained who had received some agricultural training before their special course for the Indian Civil Service began.

Thirdly, young civilians, say of five years' standing in India, might be deputed to Europe to go through a course of study in an Agricultural College on conditions somewhat similar to those on which officers of the Staff Corps and Indian Armies are allowed to enter the Staff College at Sandhurst.

Fourthly, an Agricultural College might be established India, and officers might be selected to attend there for instruction, as military officers go through a garrison course.

It is obvious that these proposals are not mutually exclusive. All or any two or more of the means suggested might be simultaneously employed.

It will be convenient to take the second proposal first.

The examination at the open competition is now conducted in the following branches of knowledge:—

English Composition - - - -	Marks
History of England, including a portion selected by the candidate - - -	300
English Literature, including books selected by the candidate - - -	300
Greek - - - - -	600
Latin - - - - -	800
French - - - - -	500
German - - - - -	500
Italian - - - - -	400
Mathematics (pure and mixed) - -	1,000
Natural Science, that is, the elements of any two of the following sciences, viz:—	
Chemistry, 500; Electricity and Magnetism, 300; experimental Laws of Light and Heat, 300; Mechanical Philosophy, with outlines of Astronomy, 300.	
Logic - - - - -	300
Elements of Political Economy - -	300
Sanskrit - - - - -	500
Arabic - - - - -	500

Candidates are at liberty to name any or all of these branches of knowledge; no subjects are obligatory. I have included the marks to show the relative importance attached to the several fields of study.

With the exception of Sanskrit, Arabic, and perhaps Italian, all these matters belong to the usual school and college courses; especially since many schools now have "Modern sides," and as the Universities have admitted Natural Science into their curricula. It has never yet been the object of the open competition to attract specialists. The theory is, with some modifications dictated by the modern spirit, after all that of the Universities themselves. General education in liberal knowledge should precede the special training required for particular professions. I am not now concerned with the propriety of this assertion. I merely maintain that it is the basis of the existing arrangement. To include in the subjects for the open competition special knowledge of agriculture, which assuredly lies quite outside the ordinary limits of English education, would be to make an altogether new departure. In support of this position, I quote from the latest general instructions to passed candidates to which I have access. These are addressed to the candidates selected in 1877, and are, in the passage cited, textually identical with

those I received ten years ago. The Civil Service Commissioners observe:—

"It is necessary that the selected candidates should at once commence their special preparation. They will remember that they have been selected on the ground of superior proficiency in subjects which (with perhaps the exception of Arabic and Sanskrit) are included within the ordinary range of English education. The Civil Service Commissioners believe that no better presumptive evidence of fitness can be obtained: but it must rest with the candidates themselves to give more conclusive evidence, by showing aptitude in acquiring the special knowledge necessary for them in the positions they hope to gain. They will be expected and required to devote their whole time to the pursuit of this special knowledge."

The statement as to the original object of the open competition made in the Secretary of State's despatch No. 19, dated 24th February 1876,¹ is to the same effect.

"The competition," His Lordship says, "is almost, if not entirely, limited to subjects which are generally taught in English public schools. The wise aim of those who founded the system was to secure that the candidates, up to the time of their being chosen, should have received the common education of English gentlemen."

The limit of age prior to the date of this despatch was 21 years. Under the orders thereby conveyed 19 years of age is the limit. At the open competition to be held in 1880, candidates will be required to be above 17 on the 1st June and under 19 on the 1st January of that year. At subsequent competitions they will be required to be above 17 and under 19 on the 1st June in the year in which the competition is held.

Now, looking to these considerations, it would be impracticable to give such weight in the competition to agriculture that candidates could succeed by virtue of that subject alone or of that subject and one or two more. As the youth should by 19 have obtained the common education of an English gentleman, and this must be tested by the competition, it follows that agriculture could not be marked very highly relatively to other branches of study. It would probably stand on a level with French or German, or Chemistry, and be allotted a maximum of 500 marks. It does not seem likely that we should by this means recruit a valuable class of specialists. The men would not be old enough to have made much progress in scientific agriculture, unless, in so doing, they had neglected the acquisition of knowledge and habits of mind which are indispensable to the executives of the administration. Even if a few modern Columellas came into the service, either by this door or by a still greater widening of the path to agricultural specialists, it would not be feasible to guarantee them continuous work in their own department, and in other directions they might not succeed. Civilians must in the first instance be competent for ordinary executive and administrative functions. If a few can add to this essential qualification some true knowledge of agriculture, that is, I think, the most we can hope to obtain.

But by placing the period of agricultural training before the time of the young civilian's first arrival in India, we should, I venture respectfully to submit, secure this result at too great a cost, and besides miss several advantages. In the two years now spent in England there is very much to be done. The course is so extensive as to demand the whole time of the selected candidate, and I do not think that it could be materially curtailed without much loss. The subjects are Languages, Law, Indian History and Geography, and Political Economy. The prescribed languages are for Bengal and Bombay Civilians, Hindustani, and for Madras, Telugu; candidates may also take up Sanskrit, Arabic, or Persian, and one additional vernacular language by express permission. The scheme for law is this—

- I.—General Jurisprudence { Blackstone's Commentaries; Austin's Jurisprudence, Vol. I.; the Institutes of Justinian; Maine's "Ancient Law"; MacKenzie's "Studies in Roman Law"; Bentham's Theory of Legislation.

II.—Proceedings in English Courts and Law of Evidence.

Reports of cases are made by the candidates who personally attend in court.

The Indian Evidence Act, Sir J. F. Stephen's Digest of the Law of Evidence and cases mentioned therein, or, in default, such parts of the treatises of Taylor, Best, and Goodeve as illustrate the principles of the Law of Evidence.

III.—Indian Laws

The Code of Civil Procedure. The Indian Penal Code. The Code of Criminal Procedure. The Indian Contract Act. The Indian Limitation Act. Hindu Law. Muhammadan Law.

Under the heading History and Geography, candidates are referred to the following books:

Elphinstone's History of India. Marshman's History of India. Mill's History of British India by Wilson. Kaye's Afghan War. Kaye's Life of Lord Metcalfe. Maine's Village Communities. Geography of India (Allen's or Duncan's). Thornton's Gazetteer.

In Political Economy, the works recommended are—McCulloch's edition of Adam Smith's Wealth of Nations.

J. S. Mill's Principles of Political Economy. Ricardo's Political Economy. Northcote's Twenty Years of Financial Policy. Goschen on Foreign Exchanges.

In addition to all of the above, it is now permissible for candidates to take up, as an optional subject at the final examination on the expiry of their two years' course, any one of the following branches of Natural Science, viz., Botany, Geology, Zoology.

It may indeed be said that, if a candidate can spare time for one of these sciences, he could spare time for agriculture instead. But I do not think that it would be found in practice that the knowledge of agriculture acquired during the high pressure of unfamiliar laws, new languages and other oriental learning would be either deep or valuable. If, on the other hand, the candidate does not begin his special study of agriculture till he has completed his two years' course, he must be kept much longer, perhaps a year longer, in England. This will place him at a disadvantage compared with the other men of his year; and, apart from the desirability of bringing the men out young, complications might hereafter arise from claims to promotion. It might be difficult to get Local Governments to admit that a man coming out in 1884 had the same claim to an officiating or permanent step as a man who joined in 1883.

The conclusive objection, however, which I venture to think exists to this proposal is, that the authorities in this country have thereby no opportunity of selecting the men to whom it might be desirable to give some agricultural instruction. It is not every officer who, even if he had the proper knowledge, would make a good use of it in India. Before the young civilians were engaged in practical work, it would be impossible to say which of them it would be really worth while to train specially in this manner. A man's choice of the subject is indeed some evidence of his aptitude for it; but here a natural wish to stay another year at home might, in some cases, unduly weight the selection. Moreover, having had no mature experience of India in any case, and in most cases none at all, the selected candidate would not be in a position to see what knowledge would be really useful to him, and in what directions effort would be wasted. I fear he might become imbued with theories applicable only to English or European farming, and find, on reaching India, that he had an immense deal to unlearn.

All these objections are met by the suggestion that the Government should start an Agricultural College in India, and depute officers thereto from time to time to learn, directly and in the country itself, how science might be applied in Indian agriculture. The great difficulties here are, in the first place, the cost of establishing and maintaining such an institution; and secondly, the rare combination of qualities which its Principal would have to possess. A thorough gentleman, conversant with applied science, and at the same time possessing practical experience in Indian farming of

¹ Page 519 of the Blue-book relating to the selection and training of candidates for the Indian Civil Service.

various kinds, might, it is just conceivable, be found amongst the planting body. But if so, he would certainly be a very successful planter, and no salary that the Government could afford to offer would be likely to tempt him from his private independence. In the present state of the finances, and till we have a sufficiency of trained men amongst ourselves to constitute a teaching staff, I look upon this scheme as quite impracticable. Years hence, when there are several Mr Bucks in every province, this alternative might be entertained.

On the whole, it is to the third of the four methods mentioned in this note that I should be disposed to look for an immediate practical solution of the question. I do not think the option of passing through a course of agriculture in Europe should be open to any civilian of less than five years' standing. Some such length of experience is, it seems to me, necessary to enable the man himself to understand what he would want to learn; and before this much service few officers are so well known to their superiors that a confident judgment could be formed as to the desirability of specially training them. There is no reason why the arrangement should involve any extra expense except a free passage to Europe and back again, and perhaps also the College fees. In Europe the officer should receive the usual two-thirds pay. It would not be necessary to give any promotion in his room; but with the remaining third of his pay a native officer might be temporarily entertained to prevent undue weakening of the administration. The time spent in Europe should in every respect count as duty, except that the officer should not be allowed to take furlough, save on medical certificate, for three years after his return to India. But there should be a condition that he should successfully pass the usual course in the college he attended. Failure to do this should involve the period of absence from

India being treated as furlough, both as regards pay and in other respects. I would not propose any competition amongst men offering themselves for training in Europe. The number sent should be limited to a very few, perhaps two or three in each year. Civilians desirous of obtaining the advantage should apply to their Local Governments; the Local Governments should on these applications make their proposals to the Government of India, who would maintain an accepted list, in accordance with which men might be sent home. Power should be reserved both to the Local and Supreme Governments to reject any application without assigning any cause.

I am the more desirous that full consideration should be given to the present question, because it may now be said to be practically admitted that the agricultural side of the Home Department will never be able satisfactorily to influence the agricultural development of the Empire till there is in every province either a Director of Agriculture, as in the North-West, or some analogous institution. To found such institutions we want properly instructed men. These are scarcely to be had at present, and it would be many years before the civilians selected in 1880 could be entrusted with the control of provincial departments in this country. If we want a supply of agricultural wise civilians within any fairly short time, it seems best to obtain this by sending home for training some men, who, at twenty-eight or twenty-nine years of age, would still be young enough to be taught.

I append the rules for the Staff College competition, which I have generally followed so far as they seemed to meet the case.

No doubt the question will not be officially dealt with by the Government of India until the Famine Commission have remarked upon it.

C. L. T.—19.11.79.

NOTE ON AGRICULTURAL DEPARTMENTS IN INDIA, BY MR. E. C. BUCK.

1. My opinion was asked some little time ago about the expediency of training young Civilians in an agricultural college in England. If the subject is still in any way before Government, I ask leave to have the following note recorded.

2. In the North-Western Provinces¹ we have had the greatest difficulty in procuring competent managers for the experimental farms. Five men have been tried, and all have failed. They have either been men imported under the orders of the Secretary of State some years ago as farmers, who have not been possessed of sufficient education or status to fulfil the duties required; or else planters who have been seeking for a situation, and therefore (as Sir Ashley Eden justly points out) *prima facie* failures.

No others have been available. Saddled as we have been with the farmers made over to us under long contracts when we first started, we have not ventured, under the late financial pressure, to send home for new men who might also turn out to be failures. There were three farms in the province, when I was given charge of the Agricultural Department, all in the hands of completely incompetent men. I have succeeded in cutting the number down to one (at Cawnpore), at which all experimental work is now concentrated. During the past year I have placed in temporary charge my Assistant, a young Civilian, Mr. Fuller (of considerable ability and the first Civilian of his year), who has done more towards bringing the farm into working order than any of the so-called farmers.² He is assisted by a well-educated man who was imported from Ireland by a Calcutta firm to grow flax, and who would at home rank as a small farmer.

I also have attached to the department, with the sanction of Government, a specially selected Engineer who spends a portion of the year at the farm and gives assistance in developing machinery.

The reasons for requiring engineering assistance were thus summed up in the famine replies:—

"One of the great wants of the department is engineering knowledge and faculty of the inventive class. Modification must be made of all Indian machinery in the direction of acknowledged improvement, since the foreign models themselves are useless on account of cost and unsuitability to Indian conditions. But whatever ordinary unskilled intelligence, such as the Agricultural Department (Civilians and farmers) may be expected to possess, may do to improve native machinery will be much better done with professional assistance."

The North-Western Provinces Government accepted this view and gave us the best Cooper's Hill man they had. Mr. Fuller and myself had hitherto been struggling to adopt European and American models (in ploughs, wells and water-lifts, winnowing machines, &c.) with only partial success. The Engineer has enabled us to do more in one year than we did before in three.

3. Such is our experience in the North-Western Provinces.¹ It proves (what hardly needed proof) that an educated intelligent Civilian can, if he turns his hand to a new trade, succeed in it fairly well, and it proves that we cannot in India find an educated farmer capable of developing improvements in agriculture.

4. But throughout all classes available, whether Civilian, planter, or native, agricultural science is practically altogether wanting,² and the only way to procure it is either to import from England scientific knowledge in the person of a trained agricultural chemist, or send home to England, to be taught agricultural science, the educated ability (*i.e.*, clever young Civilians) which we have in India.

Engineering science is wanted as much, perhaps more, than agricultural science. But we have that, and it only needs to do what we in the North-Western Provinces have done, *viz.*, turn the attention of our Engineers to agricultural requirements.

5. The question must now be considered what "scientific knowledge" we do require. In my opinion we want the *very highest scientific knowledge*, and that we shall not get it, either by importing ordinary Cirencester

¹ Experience in managers in the North-Western Provinces.

² Mr. Fuller has taken personal direction of and responsibility for experiments and operations on the farm in addition to his other duties, and, successful as he has been, cannot as a covenanted officer hold the position of Superintendent of the farm. He only does so pending the decision of the questions now under discussion.

¹ Deduction from experience.

² Agricultural science completely wanting.

³ The highest scientific knowledge in the person of an agricultural chemist should be procured.

students (who will probably be nothing more than well-trained bailiffs or land agents), or by sending home young Civilians for two or three years' agricultural training. Agricultural science is the study of a lifetime, and a science which few men in the world possess, and to attempt to teach it in two years to a young man (however clever) and bring him out to India as a scientific authority will end in failure. It will place the young Civilian in a most dangerous and illogical position.¹

What I recommend is that the *best talent available* should be brought out in the person of a well-known scientific authority and experimentalist (such as Mr. Church, late Professor of Agricultural Chemistry at Cirencester, if he would come). He should direct all purely experimental work throughout India and be responsible for the chemical analysis of soils in different parts of the country. It would be simply waste of time and money to ask a young Civilian of two years' training to spend his days in analyzing soil with doubtful results, and a very doubtful experiment to allow any Civilian whatever to direct scientific trials.

But if a Director of agricultural experiments of proved science were brought on the Imperial staff [to be at head-quarters in the summer and to travel in the winter] then, indeed, selected young civilians ought to be educated at Cirencester,² in order that they may understand the meaning of scientific language as applied to agriculture, and to the method of carrying out scientific experiments. They would have a logical position, since the final responsibility of scientific authority would not rest upon them. Each province might then set on foot a series of useful experiments conducted on a uniform scientific plan under the best possible direction, and under the most intelligent management.

6. I must now turn to what is entirely another aspect of agricultural development. Scientific results, however true, are useless unless they are introduced into the country. We may find that the outturn of a particular crop is increased by 50 per cent., through the use of a particular manure, at an extra cost of only 10 per cent., and we may prove this fact year after year by actual experiment in the Government farms. But the result will be useless unless the experiment is carried into the country.

We must have therefore special administrative machinery³ for this purpose, and the principal duty of the Civilians who I assume to be in charge of the Agricultural Department in each province will be to *interest natives in experiments which carry with them *prima facie* prospects of success.*

In the North-Western Provinces, we have had to struggle on under the burden of incompetent farmers and without agricultural science of our own (and until lately without engineering science) in our endeavours to ascertain what scientific experiments or what modifications of foreign machinery have a *prima facie* prospect of success.

Doubtless we have taken far longer to obtain results than scientific experts would have taken. But I contend at the same time that we, with our administrative experience and our knowledge (as experts) of the agricultural wants of the country, have, in the first place, been able to do what the man of pure science, whether agriculturalist or engineer, could not do, *viz.*, to pursue enquiries in the right direction; and in the second place to interest the natives of the country in those enquiries and their results.

Now that we have at last, in the face of many difficulties (one of the greatest of which has been want of science), obtained some definite results, we find that we are able, through our knowledge of native character and our general acquaintance with the conditions of the country, to make some progress in rousing native sympathy with our efforts. A proposition is at this moment before Government to found a working agricultural society composed of members who are already proved to have taken active steps towards the introduction of new agricultural methods into their estates. We have found in the province six such men who are land-

holders of position, and who without any pressure whatever from official authority have (in some cases for the last three or four years) endeavoured to make model farms on their estates. Such men as these have warmly welcomed our co-operation, but with all that I doubt if any one of them would avail himself of the results of scientific work at a provincial centre without the medium of an executive official.

It is first necessary that some responsible official, who is himself able to appreciate the result of scientific work at the provincial centre, should visit them and their estates, and by means of that courtesy, and that sympathy which they are usually glad to receive, obtain their confidence in the sincerity of our intentions. On the other hand, the Government Department can, through their means, obtain that intimate acquaintance with native agricultural requirements, which is absolutely necessary to enable us to dovetail scientific improvements with existing conditions.

Another mode for bringing presumed improvements before the notice of natives, so as to ensure (what it is our chief object to ensure), a thorough trial of each under the varying conditions of every part of the province, has been wisely suggested by Sir John Strachey in the employment of our Court of Wards' estates⁴ as model farms. Here, again, active and intelligent administrative machinery is required.

For many years to come administrative machinery is required to carry out these objects.

The outcome of my arguments is this:—

I.—There should be an imperial official of high scientific requirements on high pay at the head-quarters of the Government of India.

II.—Each province should have a separate Department consisting of—

- (1) A selected Civilian of some standing.
- (2) A certain number of junior Civilians of proved ability and scientifically trained.
- (3) One or more engineers (if possible of proved mechanical talent).
- (4) One (at least) practical farmer trained either at home or in India, in charge of a central experimental farm.

The staff (II.) thus indicated for the province is very nearly what we have (in name) for the North-Western Provinces. But the following conditions must be introduced, which will make the proposed staff much more effective in reality than it now is.

- (1) The Civilian at the head of the department will eventually be one of the young Civilians who has been *scientifically* and *practically* trained; at present the head of the department possesses no scientific (agricultural) training.
- (2) The *scientific* training of the young Civilian will be an educational course in England and the conduct of experiments in India under a scientific (Imperial) Director.

The *practical* training will be the apprenticeship served under the administrative Provincial Director.

The young Civilian will be, for some portion of his service, placed either in responsible charge of an experimental farm, or of Court of Wards' estates.

- (3) The practical farmer will be a trained overseer with proved knowledge of ordinary agricultural methods. Such men are necessary for out-of-door supervision, but cannot be trusted (alone) to carry out scientific experiments or to develop agricultural machinery.

Both the young Civilian and the engineer should be encouraged, and allowed to travel in America and the Colonies, with the object of studying machinery, and obtaining assistance from American or colonial inventors and farmers, who have been accustomed to apply western science to entirely new conditions, and from whom we have already obtained valuable machinery and information.

I wish to point out that the cost of an Agricultural Department to Government need not be large if Government will insist on the place of covenanted Civilians utilised for agricultural work being taken in the Judicial offices by native officials.

At present native officials are employed for the management of Court of Wards' estates, who are, from their

¹ Mr. Fuller, who is a clever young Civilian of experience in the special direction which is the subject of this note, positively refuses to accept the position. He does not object to be taught at Cirencester, but positively refuses to be set up as a scientific authority.

² Young Civilians to be trained at Cirencester to work under him.

³ (6) Separate administrative machinery required to carry useful results into the country.

¹ (7) Private farms require inspection.

² (8) Administration of Court of Wards' estates.

habits of thought and Eastern training, unlikely to understand the suggestions of Western science. These officials cost (say) half the price of covenanted Civilians who are now doing work in Judicial Courts that native judges can do just as well. Exchange the position of the two classes of officials and the cost to Government is the same, while the administrative gain is obtained of skilled administration in Court of Wards' estates. This is the meaning of the action which has lately been taken by Sir George Couper in the North-Western Provinces, and so far, therefore, as selected Civilians are utilised for the management of the Court of Wards' estates, their position as a section of the agricultural staff is obtained *without any cost whatever to the State*.

The next thing to look forward to is the foundation of a system of Agricultural Colleges in India. My own opinion is that we should not be in a hurry to found such a system, but should look forward to it as the goal towards which we are working. The man of science who is brought from England will have much to learn of the climate and soils before he dare give decisive advice as to the character of manures to be used, or reforms to be adopted; while our administrative and engineer sections will have their attention fully occupied for some time to come in the development of machinery suited to India, and the trial of experiments in various directions.

In sober fact, Government is not yet competent to offer an educational course in practical agriculture.

I would advise that, for the present,¹ elementary books of agricultural science should be made part of our school course, so as to prepare the mind of the rising generation for the reception of a still higher training, and that in a few years' time (perhaps even in two or three years) a selection should be made from their number for further training on the Government

farms or Court of Wards' estates; encouragement being specially given to those who are likely to follow (on their own account) an agricultural career.

I desire to suggest that it will be an unwise policy for Government to make the Agricultural Department a close Department. Young civilians who have a promising career before them in the ordinary line, cannot be expected to sacrifice their prospects for a special career which offers less prizes in the future. It should, therefore, be understood that transfer to the line may be claimed as a right after a certain number of years in the Agricultural Department.

I wish to say a few words as to the position of the North-Western Provinces Department. The principal duty which it has undertaken (that of maintaining the village records) is only remotely connected with agriculture, having for its special object the avoidance of expensive and costly re-settlements of land revenue.¹ The department is not scientific, and agricultural progress under it cannot be expected to be either rapid or scientifically effective. At the same time, I can claim that its existence has aroused interest in agricultural science, both in the official and agricultural classes, and has paved the way, in these Provinces at least, towards the construction of a system under which agricultural progress will be effective. I can claim also that it has indicated several directions in which science can work out useful results, and has itself worked out some of those which we have laid within the reach of unscientific intelligence and effort [*i.e.* of the intelligence and effort of those who are not specially experts.] More than this it would be illogical to expect. The immediate task to which I look forward as its principal duty in the next two or three years, is enlistment of the sympathy and co-operation of the most intelligent natives of the country in the work which we have begun.

E. C. B.

ÉCOLE MATHIEU DE DOMBASLE, ÉCOLE PRATIQUE D'AGRICULTURE AU CHATEAU DE TOMBLAINE, PRÈS NANCY.

(MEURTHE-ET-MOSELLE).

L'ouverture des Cours est fixée au 1^{er} décembre 1879.—L'examen d'entrée et le concours des bourses auront lieu au siège de l'École, le 29 novembre, à 9 heures du matin.

1.—BUT DE L'ÉCOLE DOMBASLE.

Par arrêté de M. le Ministre de l'agriculture et du commerce, en date du 31 octobre 1879, rendu en exécution de la décision prise par le Conseil général de Meurthe-et-Moselle, le 24 août 1878, une École pratique d'agriculture, sous le patronage de l'illustre agronome lorrain, a été instituée au château de Tomblaine, acquis, à cet effet, par le département.

L'École Dombasle est destinée à donner une solide instruction théorique et pratique aux fils de cultivateurs, propriétaires, fermiers et aux jeunes gens qui se destinent à la carrière et à l'enseignement agricoles.

L'École, située à proximité de Nancy, trouvera dans les cours, collections et laboratoires des établissements de haut enseignement, des ressources que ne présente aucune école du même genre.

2.—CONDITIONS D'ADMISSION.—DURÉE DES COURS.—BOURSES.

L'École recevra des internes et des externes.

Le Conseil général a institué deux bourses entières, deux demi-bourses et trois quarts de bourses. Les élèves boursiers, nommés au concours, seront pris exclusivement parmi les candidats domiciliés dans le département de Meurthe-et-Moselle.

Pour être admis, à un titre quelconque, en qualité d'élève, il faut être âgé de seize ans au moins au 1^{er} novembre de l'année où l'on se présente et subir avec succès les épreuves suivantes —

- 1^o Langue française, dictée et grammaire ;
- 2^o Arithmétique jusqu'aux proportions et fractions comprises ;
- 3^o Système métrique ;
- 4^o Notions générales d'histoire et de géographie de la France

¹ Mr. Fuller has already written one book of this kind adapted for school use, but not yet introduced into the schools.

Il sera tenu compte aux candidats des connaissances en dessin, géométrie, sciences naturelles et langue allemande, qui ne sont pas exigées pour l'examen.

Seront dispensés de l'examen d'entrée, comme *élèves payants*, les candidats pourvus de l'un des diplômes suivants : baccalauréat ès lettres ou ès sciences ; diplôme de l'enseignement spécial, brevet complet de l'enseignement primaire.

Les boursiers devront, en tout état de cause, subir l'examen d'entrée qui, pour eux, devient un concours et servira à les classer par ordre de mérite. Les élèves externes subiront les mêmes épreuves pour l'admission que les internes. Les candidats auront à fournir les pièces suivantes :

- 1^o Lettre des parents demandant l'admission à l'examen ou au concours pour les bourses (sur papier libre),
- 2^o Engagement des pères de famille d'acquitter le prix de la pension régulièrement ;
- 3^o Acte de naissance des candidats (sur timbre),
- 4^o Certificat de vaccine ;
- 5^o Pour les candidats aux bourses, délibération du Conseil municipal du lieu où reside la famille, constatant l'état de ses ressources et de ses charges.

Toutes ces pièces devront être adressées à M. le Préfet de Meurthe-et-Moselle, par l'intermédiaire des Maires ou directement par les parents, avant le 25 novembre au plus tard.

Les diplômes ou brevets devront être joints aux demandes des candidats qui en sont pourvus.

La durée de l'enseignement est de deux ans.

¹ As a fact, purely agricultural work occupies the least part of its time. It would be waste of Government money were it otherwise. Both Mr. Fuller and myself are engaged throughout the year in various parts of the province in work connected with the organization of the revenue records and the inspection of officials connected with that branch of the administration, and not in Farm work.

Les élèves qui, au bout de ces deux années, satisferont aux examens de sortie, recevront un diplôme leur donnant droit, sans autres épreuves, au bénéfice du volontariat d'un an.

Le Conseil général a voté une somme de mille francs, qui sera attribuée en prix, tous les ans, aux trois premiers élèves sortants, savoir :

1^o Un prix de 500 fr. ; 2^o Un prix de 300 fr. ; 3^o Un prix de 200 fr.

3.—ENSEIGNEMENT.

L'enseignement de l'École est à la fois théorique et pratique.

L'enseignement pratique sera donné sur l'exploitation de M. Louis et complété dans les exploitations voisines de l'École.

L'enseignement théorique et pratique comprendra les matières suivantes :—

1. Chimie générale (minérale et organique).
2. Physique générale et météorologie.
3. Mathématiques élémentaires, géométrie, algèbre.
4. Topographie, lever des plans, nivellement, routes.
5. Chimie et physiologie appliquées à l'agriculture.
6. Botanique et zoologie.
7. Géologie et minéralogie.
8. Agriculture proprement dite et économie rurale.
9. Législation agricole et économie politique.
10. Génie rural et machines agricoles.
11. Zootechnie et art vétérinaire Hygiène.
12. Dessin graphique et à main levée.
13. Langue française.
14. Langue allemande.
15. Histoire et géographie. Statistique.
16. Comptabilité agricole.
17. Horticulture et arboriculture.

4.—PERSONNEL DE L'ÉCOLE.

Le personnel administratif comprend un directeur exploitant le domaine à ses risques et périls ; un directeur des études, un professeur-surveillant général, un professeur surveillant chargé en outre de la comptabilité agricole de l'exploitation, un jardinier-chef, professeur d'horticulture, tous logés à l'École.

L'enseignement théorique et pratique est réparti entre 15 professeurs.

Par arrêtés du Ministre de l'agriculture et du commerce, le personnel administratif et enseignant est constitué de la manière suivante :—

1.—Administration

Directeur.—M. CH. LOUIS, conseiller d'arrondissement, membre de la Société centrale d'agriculture.

Directeur des études.—M. A. GAROLA, ancien élève de l'Institut national agronomique.

Surveillant général et comptable.—M. DOYEN, instituteur public, ancien élève du Muséum d'histoire naturelle.

Surveillant.—M. MARTIN, instituteur public.

2.—Corps enseignant

a.—Cours professés dans les locaux de la Faculté des sciences. (1)

Chimie et physiologie appliquées à l'agriculture.—M. L. GRANDEAU, doyen de la Faculté des sciences, directeur de la Station agronomique.

Physique générale et météorologie.—M. BICHAT, professeur à la Faculté des sciences, président de la commission météorologique départementale.

Histoire naturelle.—M. LE MONNIER, professeur à la Faculté des sciences, directeur du Jardin botanique.

Chimie générale.—M. ARTH, licencié ès sciences, préparateur de chimie à la Faculté des sciences.

Géologie et minéralogie.—M. WOHLGEMUTH, licencié ès sciences, préparateur à la Faculté des sciences.

b.—Cours professés à l'École.

Agriculture et économie rurale.—M. GAROLA, directeur des études, ancien élève de l'Institut national agronomique.

(1) Un service de voitures organisé entre l'École et Nancy permettra aux élèves de se rendre aux cours sous la surveillance d'un maître.

Agriculture pratique.—M. CH. LOUIS, directeur de l'École.

Topographie et nivellement.—M. BARRÉ, ancien professeur à l'École forestière, inspecteur des forêts en retraite.

Législation agricole et économie politique.—M. PUTON, avocat à la Cour d'appel, professeur à l'École forestière.

Génie rural.—M. LATOINTE, ingénieur, membre de la Société centrale d'agriculture.

Dessin graphique.—*Comptabilité.*—M. DOYEN, surveillant général, ancien élève du Muséum.

Langue française.—*Histoire et géographie.*—M. MARTIN, surveillant instituteur pourvu du brevet complet.

Mathématiques.—M. THIERRY, préparateur à la Faculté des sciences.

Langue allemande.—M. DAPP, professeur d'allemand aux écoles municipales de Nancy, pourvu du certificat d'aptitude pour l'enseignement de la langue allemande.

Zootechnie et vétérinaire.—M. BERBAIN, ancien élève de l'École d'Alfort, vétérinaire inspecteur des abattoirs de Nancy.

Horticulture et arboriculture.—M. L. HENRY, ancien élève de l'École d'horticulture de Versailles.

Des promenades botaniques et géologiques, des excursions dans les principales exploitations agricoles et industrielles de la région compléteront l'enseignement théorique et pratique donné à l'École Dombasle.

5.—DISCIPLINE DE L'ÉCOLE.

Le directeur, le directeur des études, le surveillant général et le surveillant sont chargés, chacun en ce qui les concerne, d'assurer la discipline de l'École.

Des bulletins trimestriels seront adressés aux parents.

Les élèves internes et externes seront tenus d'avoir à Nancy un correspondant désigné par leurs familles. Le correspondant sera informé des absences aux cours et autres exercices par les soins du directeur des études.

6.—PRIX DE LA PENSION ET TROUSSEAU.

Le prix de la pension comprenant l'entretien de l'élève, c'est-à-dire logement, nourriture, chauffage, éclairage, blanchissage et instruction, est fixé à 800 francs par an, payables d'avance et par trimestre.

L'École fournit la literie, lit, sommier, matelas, traversin et couverture.

Chaque élève apporte en entrant : 2 paires de draps, 2 douzaines de serviettes (une douzaine de serviettes de toilette et une douzaine de serviettes de table), 12 chemises, 12 paires de bas ou chaussettes, 2 pantalons de travail, 1 pantalon de drap, 2 gilets à manches et un gilet de drap, 2 vêtements, 2 paires de souliers ou bottes, 4 cravates, 4 chapeaux de paille, 2 casquettes dont une d'uniforme, 1 vareuse et un pantalon d'uniforme dont le modèle est déposé à l'École.

La rétribution scolaire est de 200 francs par an pour les élèves externes.

7.—COMITÉ DE PERFECTIONNEMENT ET DE SURVEILLANCE

Le comité, institué conformément à la loi de 1875, est composé de la manière suivante :

PRÉSIDENT : M. l'inspecteur général de l'agriculture de la région.

Membres désignés par le Conseil Général :

MM. COLLARD, Président du Conseil général.

TOURTEL, }
J. FAYON, } membres du Conseil général.

Membres nommés par M. le Ministre de l'Agriculture et du Commerce :

GRANDEAU, Président de la Société centrale d'agriculture.

MAGUIN, Vice-Président de la Société centrale d'agriculture.

FORTHOMME, professeur à la Faculté des sciences.

Le Directeur des Études.
GAROLA.

Le Directeur,
CH. LOUIS.

NOTE ON AGRICULTURAL IMPROVEMENTS.

By Professor W THISELTON DYER, Assistant-Director, Royal Gardens, Kew.

Royal Gardens, Kew,
August 15, 1880

The matters embraced in Chapter 3 of the Draft Report admit of a convenient classification, which is defined in Section I., paragraph 9:—

“ Technical agricultural knowledge should be called “ in to enable the productive powers of the soil to be “ applied in the most effective manner; not merely “ (i) to add to the *wealth* of the country, but (ii) to “ secure a *food supply* which shall keep pace with the “ increase of population.”

The first head may be roughly summed up as Planting and Forestry, the second as Agriculture proper.

With respect to the industries, which may be comprised under the head of Planting, it must, I think, strike everyone that, considering the magnitude and capabilities of the country, the list of new staples in paragraph 2, and the record of the improvement of old ones in paragraph 3, are not wholly satisfactory.

Tea and cinchona are of course striking successes. With regard to the former, if I may rely on statements made to me by Mr. C. B. Clarke, there appear to be obstacles to the extended consumption of the Indian product in England which deserve study. The price at which it is sold in London appears to bear no reasonable relation to that at which it can be purchased in Calcutta.

The cultivation of cinchona in India is, I believe, in the main in the hands of Government. In Ceylon, on the other hand, it is a matter of private enterprise. The controversies which have been long carried on in India as to the best methods of bark production have in Ceylon had to submit to the effective arbitrament of commercial success. The result is that methods of cultivation are being worked out there, by which a plantation may be made to give a return after four years, or (as I have been informed by a Ceylon planter) even earlier.

It is to be noticed that coffee cultivation was introduced into India from Ceylon. It is to be hoped that the example may be followed by the chocolate plant. This was successfully introduced by Kew into the Sikkim Terai, where it flourished, but was allowed to perish from neglect. (Kew Report, 1877, p. 13.) Its cultivation is already being prosecuted in Ceylon, and we are now engaged in transmitting there the most valuable sorts grown in Trinidad.

The Mauritius sugar-cane has spread all over India; but the number of varieties of the sugar-cane known in cultivation is very great. The Government of Mauritius has been to much trouble and expense in collecting them, and 130 distinct kinds are said to be grown in the botanic garden of that island. It can be hardly doubted that many of these would be better suited than others to the special requirements of different parts of India.

Two staples which particularly deserve attention in regard to India are oil stuffs and paper materials. It is remarkable that the total import of cocoa-nut oil into the United Kingdom averages only about one-fifth of the total import of palm-oil from West Africa. In India, the cultivation of the cocoa-nut is said to be increasing, but the internal consumption of the products no doubt increases equally rapidly. The West African oil palm has been introduced by the instrumentality of Kew into Borneo, and a few trees exist and fruit in the garden of the Agri-Horticultural Society at Madras. Its cultivation is about to be started in Ceylon. The external pulp of the fruit is an abundant source of oil, which can also be obtained from the kernels. These leave, after expression, a cake, which as a cattle-food surpasses all others in theoretical value as a fat producer.

The cultivation of the ground-nut is now carried on on a considerable scale in India. There is a constant demand for the oil expressed from the kernels in France, where it is used as a substitute for olive oil, both for culinary purposes and in soap-making.

Paper materials deserve consideration. It is quite evident that the supply of esparto from northern Africa is drawing to a close. The eyes of paper-

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makers are eagerly directed to the bamboo forests of our Indian possessions. In order to make the enterprise successful, the canes must be crushed on the spot, and the operation must be so conducted that the forests are not materially wasted or worn out. The question seems now to have reached a stage in which it would be worth while for the Government to make some inquiry as to what chance such an industry would have of success, and what facilities could be given for its commencement.

With regard to old staples a few remarks may also be made.

The artificial manufacture of indigo has for some time been known as a feat of synthetical chemistry. It is now, however, to be commenced in Germany, and probably in England, on a commercial scale, and it is believed that, being produced in a chemically pure state, it will successfully compete with natural indigo. It may be said that this result is some way off; but, on the other hand, I am informed that since the manufacture of alizarine, the cultivation of madder, once so important an industry in France, the south of Europe, and Turkey, has all but fallen into abeyance. If the indigo cultivation is similarly suppressed, it will of course be a gradual process, but remembering that the indigo export from British India is worth nearly three millions, it is a possibility which should be borne in mind.

The inferior average quality of Indian tobacco is a state of things which at a distance seems almost unaccountable. Much turns on a proper attention being given to the technical preparation required by the European market. By careful management the tobacco enterprise in Jamaica, which at first was as little encouraging as that of India, has been put upon a successful basis, and it is difficult to see why something of the same kind should not be carried out in India.

Opium also deserves serious attention from the European point of view. Hanbury and Flückiger make the remarkable statement (*Pharmacographia*, p. 64): “The opium of India is entirely unknown in the English market.” None of it is to be found even in London in the warehouse of any “druggist.” This is due to the small proportion of morphine which it contains, a circumstance which they think “attributable in part to climate and in part to a method of collection radically defective.” The drug used in Great Britain is chiefly Turkish, and its annual value—I have no recent figures—must approach a million.

As to Agriculture proper, it is difficult for me to say much, but from a conversation which I have had with Mr. Harman, late superintendent of the Government farm at Bangalore, and who was formerly a pupil of mine, I cannot doubt that with a slight improvement on native Indian methods more productive crops might be obtained, and much in native agricultural practice materially improved. He attached great importance to a method of stirring the ground below the depth to which it was ploughed. This enabled the roots of the plants to descend, and in accordance with well known principles enabled them to withstand drought better than they otherwise could have done, besides increasing the yield of the crop.

Paragraphs 5, 6, 7, and 8, seem to call for no remarks.

A few words ought to be said as to the position of botanic gardens in India. I have discussed this somewhat fully in the *Proceedings of the Royal Colonial Institute*, Vol. XI., pp. 294, 295. It is enough to say here that the Calcutta botanic garden (and probably a more favourable place than the neighbourhood of Calcutta could be found for it) should be the headquarters of a botanical intelligence department, ready to promote every conceivable extension of the vegetable resources of India. At present it occupies the position of a local establishment, the effectiveness of which, except in regard to the cinchona plantations attached to it, leaves in every way much to be desired. The Sahranpore botanic garden appears to be well fitted to the wants of north-western India. On the other hand, Southern India appears to be in great need of the

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stimulus and assistance of a good botanic garden. No intelligence ever reaches us of what is done at Ootacamund. It might be worth considering whether the well-organized botanical department of Ceylon might not receive a moderate subsidy from the Indian Government, and be made, as has already been done in the case of the South American India-rubbers, the depôt for supplying new introduced tropical plants to the planters of Southern India as well as of Ceylon. There is, in fact, at the present time, no botanical establishment in India suited by climate for the reception, propagation, and distribution of tropical plants proper.

Paragraph 2 of Section II appears to lay down a very sound line of policy. The higher grade of civil officials in India consists for the most part of men whose education is purely literary. However able and sympathetic, they rarely seem to me, as far as I can judge from reading such official documents as come into my hands, to appreciate the bearing or importance of practical matters relating to botany, the consequences of which might often be of moment. The result is that men who go out to India with technical knowledge, but in subordinate positions, often complain that they are thwarted or misunderstood, and eventually either give up their work in disgust or perform their duties without interest. If such men came in contact with superior officials who would understand, guide, and stimulate their work, it is impossible to doubt that much of what is so entirely stagnant in the promotion of the vegetable resources of India would be put on a healthier footing. For my own part I should attach great importance to the judgment of such superior officers in guiding men with technical knowledge, who would work under them. A young man, however able and well informed, must require a considerable apprenticeship in the country before he can begin to work usefully in India. The great point is to place such men under the control of chiefs with sufficient knowledge of the technical matter in hand to command the respect of their juniors, and who will consequently be able to guide without pooh-poohing them. Paragraphs 2 to 4 entirely meet this point.

How are such men to be got? I believe that an abundant supply could be obtained from Oxford and Cambridge, not to speak of other universities. At Cambridge, where I have examined for the Natural Science Tripos for four years, there is a flourishing scientific school, and it attracts numerous young men of first-rate ability. But from what I know of the matter, I apprehend that the present portals of the Indian Civil Service are practically closed to all but men with a high literary training. I doubt whether the bent of their minds and the whole course of their training does not unfit such men for taking any practical interest in

such administrative matters as I have discussed in this letter. Those who would do so, and whose mental faculties would not in any way be inferior, are, I believe, now practically shut out by the conditions of the competitive examination. Should an alteration be made in those conditions, it will be very important to see that the science which is taken in lieu of literature has been acquired in such a way as to give it an educational value. After all, it is not so much the scientific knowledge as the scientific attitude of mind which is needed. Given the latter, the former is easily acquired.

Section II., paragraphs 9 and 10 seem to lay down all the requirements for the education of good scientific agriculturalists. The difficulty which presents itself is where is the education to be acquired. Perhaps the requisite instruction might be given at the Cooper's Hill College. Arrangements would have to be made for a chair of agricultural chemistry and one of botany from the agricultural and physiological side. The appliances existing at the college for teaching physics and ordinary chemistry would be available, and for farm-work the students could not do better than go for a year to such an institution as the Wiltshire and Hampshire Agricultural College, which has been started at Downton, near Salisbury. With suitable arrangements some of the students might also be placed with the bailiffs of some of the great estates in the country where farming on a first-rate scale is carried on.

A few of the students who showed particular aptitude might be allowed to study in Europe the conditions needed for the development of particular staples, such as tobacco and opium, so as to know what to aim at on reaching India. Others might also be encouraged to specialize their studies in the direction of plant diseases, so as to be able to devote their attention to these serious matters in India.

The only criticism I would offer on the course of study is that it is not desirable to lay too much stress on soil analysis. Plants analyse soils better than the chemist. A better judgment of the capability of a soil is obtained by the study and analysis of what will grow upon it, than by a careful examination of the soil in the laboratory.

The manual of Indian food products, which is likely to be prepared, would be a first step towards giving Indian agriculture a scientific basis. Nothing is known in this country about the nutritive value of Indian food-stuffs or their ash-ingredients. A comprehensive account of the plants actually grown in Indian agriculture, with full chemical information about them, is a first and indispensable step in dealing with the subject. Something is wanted, in short, to do for agriculture what Brandis's Forest Flora of North-west and Central India has done for the Forest Department.

IV.—FORESTS.

MEMORANDUM ON THE MANAGEMENT OF DISTRICT FORESTS IN THE KOLAR DISTRICT OF THE MYSORE PROVINCE.

1. This district has or had no forest producing any valuable timber such as Teak, Black-wood and Honne, but there are many tracts where other species of wood such as Jalari (lac), Babul, Nim, Karanj, &c., could be grown, and numerous forests of this kind appear to have been in existence in former days. These had all, I believe, been formed and conserved by the villagers with the aid of kavalgars or watchmen who were, as a rule, remunerated by the village agricultural community, the Government only supplementing the remuneration by small grants of Inam lands in some special cases, but these forests gradually disappeared as the patels gave up their interest in them in consequence of their service Inam lands having been thoughtlessly resumed about 60 years ago by the Government of the day.
2. I was sadly struck with the barrenness of the country when I first took charge of the district in 1864, and having spoken to the intelligent and influential patels on the subject, pointing out to them the great benefit the ryots would derive from having wood in their neighbourhood, and assuring them that their services in conserving forests would be recognized by the present Government, they conserved suitable tracts within the limits of their villages, and their example is now gradually followed by others.
3. At the outset, there was, of course, some difficulty in reviving the good old custom of the country about the conservation of forests, but it is no longer felt, as under the arrangements made in this district the sympathies of the very parties from whose reckless and clandestine felling of the wood we have to protect the forests are enlisted, and they are made responsible for their conservancy, bearing themselves all the cost of it, instead of employing any outsiders to watch the forests, and subjecting the ryots to all sorts of annoyance and hardship.
4. The following are the arrangements—
 - I.—No lands cultivated or cultivable which are close to the village, nor those conveniently used as pasturage common to be taken up for forest.
 - II.—Mountains and hills, and in their absence other uncultivable lands at some distance from the village, to be reserved for growing wood.
 - III.—In rainy seasons, the ryots to be put down in the reserved tract, seeds of indigenous trees commonly grown in the locality.
 - IV.—The Patel to employ one of the village servants, where available, and some one else in other places, to watch the forests of his village, making arrangements with the ryots about the remuneration of the servant so employed.
 - V.—The ryots of the village concerned to be allowed in return for this service, to collect dried brushwood for fuel and cut long grass for thatching, &c., in the reserved tracts.
 - VI.—None to be allowed to let the cattle, particularly goats and sheep, into the reserved tracts, until at least the trees grow to such a height that the beasts could do no injury to them, and none to enter into them with any cutting instrument.
 - VII.—No one to fell any timber or bamboo without obtaining a license from the district officer, and no license to be issued without previously consulting the Patel as to the fitness of timber or bamboo to be cut, as he is held responsible for the growth and protection of the forest of his village.
5. It is the duty of the Patel to report if any mischief is done to his village forest, and such mischief is punished for either under the Forest Rules or the Indian Penal Code.
6. The Shekdars of Hoblies are to inspect these forests as often as possible, and see that the above arrangements are carried out properly, reporting on their condition to the Amildars, who are again to submit their reports to the district officer after their periodical inspection.
7. The forest conservancy under the above arrangements is working smoothly, and the patels and shanbogs generally take so much interest in this good work, that in many places they have employed men to watch the forests of their villages, either setting apart the produce of a particular portion of their own holdings or cultivating and paying the assessment of a separate field, for their remuneration, and also arranging with the ryots to pay their quota of the remuneration in grain at so much for a plough; and I have also in a few cases obtained the Chief Commissioner's sanction for the continuance to the hereditary watchmen of their service Inam land which had been resumed under the recent settlement of the Inam Department.
8. There now many forests thus managed in all the 10 taluks of this district, the number of the extensive ones being 67, and their approximate area in round figures being 152,000 acres, excluding the petty village forests, of which there are hundreds. Sir Richard Meade was pleased to inspect some of these forests when he made a tour in this district in 1874 and distributed presents to some of the patels in recognition of their services in this matter.
9. There are still many tracts in this district fit for growing forest, and with some exertion on the part of the revenue officers, they can also be easily conserved, as new Inam lands or other emoluments are now attached to the office of Patel.
10. With the object of encouraging the individual ryots to grow forest, I proposed sometime ago that the system introduced by the Survey and Settlement Department of putting up annually to public auction the unarable lands for grazing purposes, may be discontinued, and such lands leased out to individual villagers at a fixed pasturage rate which, in this country, is 1 anna and 9 pic per acre, the Government reserving their right to all the wood therein grown; and the Chief Commissioner, Mr. Dalryell, was pleased to observe in his proceedings of the 7th May 1876 that the matter was under his consideration, and that information was called for from the Commissioners of Divisions on the subject, but the question still remains unsettled. My belief is that if this proposal be carried out, it will not only enable the Government to get permanently more revenue than the fluctuating income it now derives from the annual sale, but will also obviate the trouble of selling each number every year, a practice by which the Government loses when there is a combination in the village, and the ryots suffer if there are factions among them, one party bidding against the other, not for gain but from spite.
11. If one man is allowed to take up such tracts of land as may not be required for the Government forest, at fixed rates for pasturage, he will necessarily let trees grow, as a piece of land under the shade of trees retains more moisture which adds to the growth of grass, whereas the purchaser of the grass at the annual public sale simply looks to his gain for the year without caring for the trees growing in the land. This is not my mere conjecture. There are instances of lands leased out at pasturage rates in some part of the country not yet surveyed being covered with trees, while those annually sold are quite bare and treeless.

B. KRISHNENGAR,
Dep. Commr., Kolar District.

Camp at Gumnaikanapalya,
30th July 1878.

THE INFLUENCE EXERCISED BY TREES ON THE CLIMATE AND PRODUCTIVENESS OF THE PENINSULA OF INDIA.

Honourable
Court of Di-
rectors' De-
spatch of
1847.

Para. 1 Pending the investigation by the House of Commons into the causes of the recent famine in Southern India, it may be useful to show what has been done since the Court of Directors wrote their Despatch No. 21, of 7th July 1847.

2. In it the Court requested the Government of India to ascertain the "effect of trees on the climate and productiveness of a country, and the results of extensive clearances of timber." That an abundance of wood increases moisture, and that a deficiency promotes aridity, seemed to the Court clearly deducible from the researches and observations which had been made on the subject. The Court further observed that the decrease of moisture which has taken place in various parts of America has usually been attributed to the clearing of the forests, and where the country, as has sometimes happened from political causes, has returned partially to its original forest state, the contrary effect had been observed. As the removal of trees had been followed by great diminution of the volume of water in the rivers and lakes, the restoration of wood was succeeded by a corresponding increase in the quantity of water. The Honourable Court, however, went on to observe that the modes in which the presence or absence of trees influence the climate of a country are by no means so clear as the fact itself. It is generally believed that the clearance of trees is followed by a diminution of rain falling in the country subjected to the process; further, it is considered that a part, at least, of the change effected by clearances may be attributed to increased evaporation, and it has also been suggested that the effect may be ascribed to the diversion of water to the purposes of cultivation. It seemed to the Court not unlikely that each of these causes may operate to a greater or less extent under different combinations of circumstances, and that two or three may frequently act together.

3. "The subject," the Despatch continues, "is one having a strong practical bearing on the welfare of mankind, and we are anxious to obtain extensive and accurate information in regard to it. We desire, therefore, that you will furnish us with any that you may possess, and that you will institute inquiries in such quarters as may be likely to lead to the acquisition of particular facts bearing upon the question. It has been suggested that the circumstances of the district of Azimghur afford some illustration of the subject, and we shall be glad to receive a correct report of any facts relating either to that district or others which may be calculated to throw light upon the subject of our inquiry."

Surgeon
Gibson
states in-
creased
aridity and
tempera-
ture conse-
quent on
forest
clearings.

4 Subjoined to the Despatch was an extract from a letter, dated 9th March 1846, from Surgeon Gibson, of the Bombay Medical Department. That officer was, for a prolonged period, Conservator of the Forests of the Western Presidency, and almost lived in the forest tracts. In the letter alluded to, he stated that the clearing then going on must, at no distant period, be injurious to the fertility of the adjacent garden and rice lands, and, indeed, of the country generally, with the further disadvantageous effect of a considerable increase of the annual mean temperature, and of the dryness of the climate. He mentioned that, since the South Konkan had been, to a great extent denuded of forest, all the inhabitants concur in asserting that the springs had left the uplands, that the climate had become greatly drier, the seasons more uncertain, and the land less fertile; and, while in Canara the exuberant moisture of the sea air soon covers the denuded hills with a matted jungle of brushwood and small shrubs, the different climate of the upper country does not admit of this effort for speedy reproduction. The shoots from the felled trees remain green for a time, and on these perishing, or being cut away, the hills remain bare.*

5. Subsequently, in 1854, Surgeon Gibson sent me a letter to his address, dated Mahabaleshwar, 21st February 1846, in which the writer mentions the common belief in the Konkan that, with the removal of the wood, the small streams had more or less dried up.

Action
taken by
the Govern-
ment of
India.

6 The Government of India took immediate action on the Honourable Court's Despatch, and (28th August, No. 789 of 1847) asked the Madras Government for any available information respecting the effect of trees on the climate and productiveness of a country or district,

and the results observed of extensive clearances of timber. In the usual course of business similar communications must have been addressed to the other local Governments, but the only reports made public were three from Madras. When I heard of the inquiry, I furnished a copy of a memorandum on the subject, which I had written and published about the year 1810, and the Madras Government reprinted and distributed it widely, and sent it also to the Governments of Bengal, Bombay, and Agra, and to the Court of Directors (Minutes of Consultation of 8th September 1848). My memorandum subsequently appeared, extended, as an article in the Madras Journal of Literature and Science No. 30 of 1849. I had previously seen much of the Peninsula, perhaps few officers of Government have seen so much of it, and my memorandum commenced with the remark that, with the exception of a few localities in Southern India, the whole country seems destitute of trees. Whether they have disappeared under the hands of man while none were being planted to supply their places, or whether they never existed, nothing so much strikes the attention as their general scarcity, and, I added, we cannot but look upon the cultivation of trees as of vital importance in such a country as India, where, under a tropical sun, the atmosphere is so likely to be loaded with miasmata, and the fertility of the land is so much dependent on the supply of water. The facts then adduced seemed to justify the conclusion that the foliage of trees greatly influence the purity, humidity, and temperature of the atmosphere, and the supply of water on the earth's surface, by attracting clouds and condensing the moisture in the atmosphere, diminishing local temperature, protecting the soil from the action of the sun's rays, and husbanding the rain by regulating its flow. Instances were given of injury following the denudation of the land, the increasing cost of firewood and of timber was alluded to, and I pointed to the famine in Bengal in the middle of the 18th century, when a third part of the population are said to have perished, and to that of 1839, when half a million are said to have died. The conclusions to which I came, from the information then before me, were that the bareness of the Bellary district is a cause of its aridity, also,—

Assistant
Surgeon
Duffour's
Memorandum
of 1849 &c.

and his con-
clusions.

- (1.) That the extensive clearing of a country diminishes the quantity of running water that flows over its surface.
- (2.) That it is impossible for us to determine at present whether the diminution is owing to a smaller annual fall of rain, or to increased evaporation of the surface water, or to these two causes combined.
- (3.) That it is, however, shown by the authors above quoted, that rain oftener falls, and that more dew is deposited in well wooded countries than when a country is naked, and, drawing our conclusions from the meteorological facts collected in equinoctial regions, we may presume that the extensive clearing of a country diminishes the actual quantity of rain that falls upon it.
- (4.) That mountains, particularly when covered with their native forests, by an electric action on the atmosphere, cause clouds to gather around them condense and collect the vapours of the air, and equalize the fall of rain.
- (5.) That the forest trees which grow on mountain summits have a structure peculiarly fitting them to receive the waters of the clouds.
- (6.) That lands destitute of the shelter of trees allow of more rapid evaporation.
- (7.) That, independent of the preservation of surface water, forests husband and regulates its flow.
- (8.) That, in all forest tracts, the temperature of the air is more equable throughout the year; that, in tropical regions, the atmosphere around trees is cooler, and contains more moisture, than the air in the open glade; that the atmosphere of a tropical country, without trees, has an arid dryness in it totally dissimilar to the cool softness of a well wooded one; that lands covered with trees are cooler and moister than those which are exposed; that, in hot climates, the destruction of forest trees, by inducing aridity, destroys vegetation, and that forests and trees afford the shelter from violent winds

* This letter merits publication.

which is absolutely essential to the health of the vegetable creation

- (9.) That springs draw their supplies from sources in their immediate vicinity, and the presence of trees, near these sources, seems to prevent the dissipation of the supply of water.
- (10.) That in clearings which are purely local, springs may disappear without their being any ground to conclude that the annual quantity of rain has diminished
- (11.) That the tenacious clayey under-soil, found in forests, is peculiarly adapted for preserving the surface and subsoil waters.
- (12.) That there is a difference in the condensing power of trees, but by means of the vegetable creation a valuable supply of moisture is collected from fogs, and from the atmosphere in the form of dew.

7. It had previously been recorded (p. 11) that trees, by the nature of their respiration and radiation from their leaves in a sky without clouds, surround themselves with an atmosphere constantly cool and misty. They effect the copiousness of springs, not, as was generally supposed, by a peculiar attraction for the vapours diffused through the air, but because, by sheltering the soil from the direct action of the sun, they diminish the evaporation of the water produced by rain; that, so soon as man, to supply his wants, has thinned or removed the trees which clothe the hill sides of the district he inhabits, the rain diminishes or rapidly runs off, the rivers dry up, and the previous fertility of the lands completely disappears; and, "by felling the trees that cover the tops and sides of the mountains, men, in every climate, prepare at once two calamities for future generations, the want of fuel and scarcity of water."

Disbanded
forest rivers
and fertility
disappear.

Southern
India
climate im-
provable by
arboricul-
ture.

And I wound up these conclusions with the remark that, "if the facts detailed warrant these deductions, it may be confidently asserted that Southern India would be greatly enriched and its climate ameliorated by the introduction of arboriculture; that only the Government, or the Civil servants of the State, could accomplish anything on a great scale, but their efforts may be seconded by every individual resident in it, and the man who makes a few trees grow where none grew before will be a benefactor to this country" (pp. 47-48.)

General
Cullen's
report lays
stress on
the value of
mountain
forests.

8. Since these views were made public in 1840 and 1848, the further information obtained has corroborated most of the conclusions to which I had then come, as I will now show. My letter was followed by one from General Cullen, on the 31st March 1849, which the Madras Government likewise made public. General Cullen laid great stress on the value of mountain chains in arresting and condensing the vapour of the atmosphere, and on the effect of forests during a great part of the year in preventing the dissipation of the superficial moisture, but he doubted if that circumstance could have much influence on the rainfall or on the supply of water from springs. Another letter, made public by the Madras Government, was from Surgeon U. J. Smith, of the Mysore Commission, dated 23rd June 1849. In it, Dr. Smith records the belief of the people of Coorg and of the superintendents of the Nuggur and Chittledroog divisions of Mysore, that the presence of trees in a country tends to increase the quantity of rain. He furnished three instances of the destruction of springs by denuding the ground of trees. One of these was in a range of hills south-east of Bangalore, at a coffee plantation called Glenmore, in the Dehenacottah taluk of the Salem district. The proprietor, when preparing ground for a coffee garden, which was watered by an excellent spring, was warned by the natives not to clear away the trees in the immediate neighbourhood of his spring, but he disregarded their warning, cut down the trees, and lost his stream of water. Another instance was at the village of Hoolhully, about eight miles distant from the head of the new ghat at Munzerabad. A planter had a nursery there, which he watered by turning on it a watercourse from a spring. He cleared up, for planting, the sides of the ravine in which the spring was, and ceased to have anything like the quantity of water he had before the shade was cleared. The same planter, close to the bungalow where there was a spring, had some years before cleared a ravine for planting, and found the water decrease in like manner: but the coffee trees dying away, and the place being too small for a plantation, he did not renew them, and allowed the jungle to grow up again, since which the stream had nearly

dry
and of

regained its former size. The superintendent of the Nuggur Division also, at that time, wrote, "that 'springs of water shaded by trees almost invariably 'dry up on trees being cleared away. This has been 'observed on the Neilgherry hills, and many other 'woody districts.' Surgeon Smith further mentioned that in Coorg and the hill countries it is impossible to move off the road when walking early and before the sun has dried the ground, the dews are so heavy and the dripping from the trees so wetting, yet the roads are perfectly dry. In the north of Coorg, in December, and in Munzerabad in January, he had found it impossible to move off the roads until the sun had dried up the dew with which the path and brushwood in the jungles was daily saturated. On the Baba Booden hills, in April 1848, the hottest season of the year, he found the fog so dense till 8 or 9 a.m., and the condensation of water on the trees in the jungles so great, that he became wet through in moving among them."

Moisture
from trees
dripping,
and from
fog and
dew

9. These three reports from the Madras Presidency, by myself, General Cullen, and Surgeon Smith, so far as I know, are all that have ever been printed, and there has never appeared any report from any of the other Presidencies. If these have never been furnished, they might even yet be called for, merely for the sake of science, as the information existing is sufficient for the purposes of administration.

10. The revenue officers of the Madras collectorates sent in reports, of which I was allowed to take copies, and others on the forests of the Peninsula of India. The whole of the reports that have come before me bear testimony to the rapidity with which the forests have been swept away, particularly since the introduction of railways. Conservancy and planting should always have been continuous, but the instant that railways were resolved on planting operations ought to have been greatly extended. Mr. Blane, collector of Canara, wrote in the most earnest manner from Mangalore, denouncing the Coomree, a destructive form of cultivation mentioning that the forests had been largely destroyed and urging their preservation, pointing out the injurious effects produced on the climate and on the fertility of the soil by the extensive clearance of a country, and recommending a declaration of the right of the Government to all forests which cannot be clearly proved to be private property.

Madras
revenue
officers' reports.

Mr. Blane
denounces
the destruc-
tion of
forests.

11. Mr. Henry Forbes, sub-collector of the Rajahmundry district, reported that the forest had receded, but he thought it open to question whether the diminution in the streams which come from the hills is not in the time which the stream takes to exhaust itself, instead of the body of water passing down to its bed, whether the rain is not said to be less in quantity only because, falling on the hills, and no longer restrained by the trunks and roots of trees, and allowed no time to percolate through the soil and the fissures of rocks, and to supply the reservoirs of the springs, it pours down in torrents and leaves the water courses dry as soon as the rain has ceased to fall.

Mr. Henry
Forbes
thinks the
rain runoff
more rapid-
ly after
clearances.

12. Mr. H. V. Conolly, collector of Malabar, furnished the rainfall for 38 years, and mentioned that the amount had by no means lessened of late years, though the clearance of jungle land had been great. I reproduce this rain return, but rearranged in three portions of 13, 13, and 12 years respectively, (see top of p. 104) and, as will be observed, it shows the considerable increase of from 122.88 to 130.10 and 141.33 inches in the three periods.

Mr. H. V.
Conolly
considers
that the
rainfall has
not dimi-
nished.

13. The cultivators of Torriore and Volcondalipoorun, stated to Mr. William Elliot, collector of Trichinopoly, that so much rain had not fallen since the jungle between the Cusbah village and the adjacent hills was removed, that the heat and wind were much increased; their wells and tanks also had not yielded the supply they did formerly; that the place was not more healthy, and the dry cultivation was much increased.

Mr. William
Elliot
reports di-
minished
rainfall and
water sup-
ply and in-
creased
heat.

* Canara, 31st August 1847.
Canara, 8th November 1847.
Rajahmundry, 6th January 1848.
Coimbatore, 6th January 1848.
Ootacamund, 26th January 1848.
Tanjore, 25th February 1848.
Kurnool, 29th February 1848.
Nellore, 4th March 1848.
Calicut, 4th March 1848.
Trichinopoly, 7th March 1848.
Bellary, 9th March 1848.
Alicot, North, 26th April 1848.
Salem, 10th May 1848.

Anjarakandy.		
1810 to 1822.	1823 to 1835.	1836 to 1847.
Inches.	Inches.	Inches.
125.93	130.67	118.13
104.89	101.26	120.22
102.70	126.55	92.14
93.85	134.80	151.20
115.10	158.10	116.04
133.40	161.71	157.60
102.10	129.21	145.04
136.76	112.21	170.46
169.19	145.22	130.39
135.47	136.58	137.57
138.13	135.12	164.21
94.44	98.47	192.95
145.60	131.40	—
1597.50	1701.30	1695.95
122.88	130.10	141.33

The ryots of Oodharpalliam and Arrealore seemed to think that the removal of their small jungle had been productive of no evil, so far as the supply of water was concerned.

Mr Binning reports lessened rainfall.

14. In North Arcot. Mr. Binning, the collector, was informed that "the rains, for the last 20 years or more, had not been so copious or regular in that district as in former days," and that, of late years, the jungles and supplies of water had gradually diminished.

Mr. Lockhart reports drying up of streams.

15. The people of Salem told Mr. Lockhart that when the streams from the hills of Collymally, Tallamally, and Niramally were covered with jungles, the water was continually running, but after the jungles were removed and the lands were converted into nurjah and totakal fields, by means of reservoirs, wells, and tanks, these natural streams had been affected.

Mr. Mellor reports aridity of Bellary district and contrasts Ramandroog.

16. The report from Bellary, came from Mr. Mellor, the collector remarking on the extreme aridity of that district in contrast with the Ramandroog Hill, 3,100 feet above the sea, which was frequently for some hours after sunrise enveloped in a most dense mist.

Denudation of Ramandroog hill side.

17. I will here mention that the Ramandroog and Coomarasamy hills still contrast strongly with the arid plains of the Bellary district. When serving at Bellary in 1845-47. I was sent to Ramandroog to report on its suitability as a sanitarium. I lived on the hill for a time during the south-west monsoon. Looking westward towards the valley of the Tumbudra, the fields might be observed bright with sunshine, but as the winds ascended the hill side their moisture became more and more condensed, and as they swept like a thick mist over the edge of the plateau, the trees dripped as if under a heavy rain. Subsequently, in 1863-65, when again employed in the Ceded Districts, I twice revisited the hill, and had to bring to the notice of the collector the great diminution that had occurred in the trees on its edge and sides, and to suggest the need of preserving them. At Bellary, during the south-west monsoon, clouds pass over so continuously as to shade the sun for days, but rain seldom falls. The Copper Mountain to the south, over which the south-west wind passes, has not on it a tree which could break the motion of the wind, and I suggested to the collector the need for planting it. There is no part of the south of India more in need of the paternal care of Government than the Ceded Districts.

Forests and woody tracts slowly but generally diminishing

18. The question of the capabilities of the forests of Southern India for meeting the wants of the community was largely noticed in the Parliamentary Paper on the Porto Novo Iron Works (pp. 103,150,154-55, 162, 250, 263, 268, 277, 299, 312 to 321, 323 to 326, 338 to 340, 346, 361 to 364, 369 to 371, and 374). and when writing on the Iron Ores and on the Manufacture of Iron and Steel in the Madras Presidency (1855), I reported (p. 9) that there was "one fact shown connected with the "best interests of this manufacture which merits the "early consideration of Government. It is the slow "but general diminution of the forests or wood tracts "from which the smelters procure their charcoal. It "is to be supposed that with the increase of population "the forests in their vicinity would be cut away, but "this (the Madras) Government and the Honourable "Court are so fully alive to the necessity for foliage in

"a tropical country, that it is only necessary for me to "draw attention to the diminution going on, to have "measures taken to secure for the country, and for the "people themselves, therefore, that trees cut down for "fuel should be as little wasted as possible." I pointed out that the Swedish Government, in order to protect the fuel preserves, permit only a certain number of tons of iron to be produced yearly, and as, in that "country, 20 years are required for a new plantation "to grow into timber, only a certain portion of the "forest is allowed to be cut down annually and the "spot replanted." And now again, writing after many years, I can only point to the necessity for replanting largely and carefully, and protecting the plantations throughout the tracts that have been denuded. Population has greatly increased, and public works and railways have largely augmented the demand for fuel and enhanced its price. Since my Report appeared on the Iron Manufacture, the Conservators of the forests have been continuously drawing the attention of the several Governments to this point. Surgeon Gibson (Bombay Forest Report, 1849 to 1856, p. 5) reported that the charcoal used in the extensive iron works at Bepore had risen in price by upwards of 100 per cent within the last few years, that (Report, 1857-58-59 and 1860, p. 115), owing to the vicinity and activity of the railway, the rise in the price of firewood, obtained from the side branches of trees, had been about 75 per cent. and the tendency was still upwards.

19. His successor, Mr. Dalzell, has mentioned (Selections from the Records of the Bombay Government, No. 76, p. 24) that, in Bombay, the price of fuel had risen from Rs. 3 to Rs. 8 per candy or Rs. 24 per ton, and that Bombay was then annually burning 300,000 tons, of value, therefore, three-quarters of a million sterling.

20. The Military Board at Madras during many years watched the Sriharicottah jungles which supply Madras town with fuel. The Conservator (Madras Forest Report, 1859-60, p. 1), early reported that there were "many causes at work which are gradually thinning "the ranks of the indigenous forests of the Madras "Presidency, the first and by far the most formidable "of these being railway requirements. It is," he says, "scarcely credible the many thousands of large forest "trees which have been felled in the neighbourhood of "the various lines of railway within the past few "years. But another source of diminution, affecting "only scrubby copse and minor forest, is the extension "of cultivation consequent upon the reduction of the "land tax and increased facilities of communication. "There is every probability that the clearing both of "the forest and jungle will go on so long as grain "maintains its present tempting prices."

21. The records of the Government Central Museum which I formed at Madras in 1850, and those of the Mysore Museum, which I formed at Bangalore in 1865, contain information worth examining as to the state of the forests and the timber and fuel supplies. In 1854 (1st July) I sent a circular all over Southern India calling for reports on its forests and woods (Appendix D.). The reports came duly to hand, but the extent of work that devolved on me from 1855 was such as to wholly prevent me from reviewing them. But, at that time (Extract, Min. Cons., 3rd January 1856, Appendix C.) the Madras Government had become fully alive to the waste committed in the valuable Government forests and asserted that the whole of the forests of Wynad belong rightfully to the Government in succession to the Pichee Rajah, but that private claims, founded on no good basis, had been allowed to spring up, and had, in some cases, been officially admitted, to the great injury of the rights of Government. The Collector was then ordered to report on the extent of the forests and the means to be adopted for preserving them. It would be of value to have that report made public.

22. The progress of railways and of large public works was already causing the scarcity of fuel to be severely felt, and its price had risen 25 per cent. within a few years. (Report, Conservator of Forests, Madras, 1159-60, p. 14.) The fuel here alluded to was that used for cooking by Europeans and a large proportion of the Native population, who also use bratties made of cow-dung. In Bellary and other barren districts the firewood chiefly consists of branches of thorny bushes, there being almost a total absence of forest trees (Ibid.). On the Neulgherry Hills peat or turf fuel had been brought to notice by Captain Campbell, of the 21st Regiment, Madras Native Infantry, and was being used more than formerly, thus lessening the demand for wood and charcoal. It is a matter of scientific interest

ment that the peat of the Neilgherries is different from that of Europe as regards the producing plants. Specimens of it and of peat brought from Thibet by Dr. Falconer were sent to the London School of Mines for analysis. Search might be made for other peat localities, to meet the increasing requirements of a rapidly increasing population, who, having no mineral fuel, expend daily 2 lbs. of firewood per head or the third part of a ton per annum.

23. In the meantime the state of the forests of India had been attracting the attention of the scientific world. The British Association had appointed a Committee (Dr. Hugh Cleghorn, Madras Medical Department, Professor John Forbes Royle, King's College, London, Captain R. Baird Smith, Bengal Engineers, Captain Richard Strachey, Bengal Engineers) to consider the probable effects in an economical and physical point of view of the destruction of tropical forests. Their report appeared in the Proceedings for 1851 (pp. 78-102). It reviewed the existing information in the writings of Humboldt, Drs. Wallich, Wight, Helfer, and Griffiths, Captains Onslow and Harvey, Major Cotton, Messrs Blundell O'Riley and Seppings, and of a memorandum of 1849-48, and it concluded by strongly urging the protection of Indian forests and the planting of trees.

24. Between 1860 and 1863, Mr. Justice Innes, of Madras, issued three pamphlets, one of them a letter addressed to Sir Stafford Northcote, Secretary of State for India, urging the importance of planting the hills with trees wherever a tree will grow.

25. In 1863, Mr. N. A. Dalzell, Conservator of Forests in the Bombay Presidency, furnished observations on the Influence of Forests (No. LXXVI, Selections from the Records of the Bombay Government, p. 12), in which he showed that the wanton destruction of forests had entailed barrenness and aridity on countries renowned in former times for their fertility; that, along with woods, springs and rivulets disappear and cease to water the parched land, that the actual temperature of a country is, by the destruction of its forests, very sensibly increased; that the rain, gradually washing away the vegetable earth from the sides of the denuded hills, condemns them to sterility, while these latter, no longer able to retain and regulate the flow of water that falls on their slopes, are scored by deep gullies, formed by impetuous torrents, and the beds of rivers are at one time dry and at another filled by sudden and shortlived floods. He urged (p. 22) the conservancy of every patch of forest in the country, the suppression of "dullees" or destructive cultivation, and the putting a stop to the pernicious practice of setting fire to the brushwood on the slopes of the hills and to the jungle generally.

26. Mr. Dalzell was here reproducing the conclusions at which previous writers on the subject had arrived, and the recommendations made by them.¹

27. It has recently been pointed out that Hindus of former days planted groves as acts of merit and made them over to the public. This might be revived. When Mr. Robertson, the Superintendent of the Government Farms at Madras, visited Coimbatore in the autumn of 1875, he found that during the last 30 years a large area of land had been denuded of trees, partly in view of an extension of arable culture, and partly to provide fuel for the railways and for domestic use. 700,000 acres, which were growing jungle scrub and coarse grass, had, during the preceding 18 years, been brought under the plough; and, being now bare for two-thirds of the year, this must affect climate. The people unanimously declared that the rainfall had been gradually diminishing during the last 20 or 25 years, though it was not always referred to this cause. He was satisfied that the farmers would consent to plant trees in proportion to their acres, and he advised the formation of groves and village fuel preserves, the use of manure, and well cultivation, and deprecated the use of cowdung as fuel, depriving the soil of it as manure.

28. In consequence of the awful famine in the South of India in 1877, Sir Richard Temple was sent to the aid of the Madras Government. Writing as to the future of the Peninsula, he says, "We cannot but reflect whether the uncertainty of season, which often proves so disastrous in Southern India, is not becoming worse and worse; whether there may not

be some physical causes at work to render the rainfall precarious, and whether such causes can be ascertained and obviated. It is hard to conceive a question more practically important than this. The discussion of it would be beyond the scope of this Minute. But, connected with it, there is one particular matter which may be mentioned forcibly, though briefly. The Southern Peninsula of India has been or is being denuded, not only of its forests but also of its jungles, its groves, its brushwood, its trees. The denudation has been, as I understand, going on near the sources and in the upper courses of the many rivers which water the country. Thus, before denuded, perhaps, is being in some degree checked. But with the progress of coffee planting and with the assertion of communal rights on behalf of the people, the utmost vigilance will be needed to keep it within bounds. If it were to proceed unchecked there would be imminent danger of the rivers running dry, by reason of the catchment basins and the drainage areas near their sources being rainless. And as these rivers supply the great canal systems, this danger has only to be mentioned in order to be felt. The same argument applies in a lesser degree to the tanks or lakes, which are second only to the canals in usefulness for irrigation. It has already been seen how precarious is the position of the reservoirs, even with one year's drought. The progress of the country causes the price of timber and firewood to rise. The introduction of railways has, in the absence of any coal mines, greatly augmented the demand for fuel. Strong temptations are thus inevitably offered to the people at large to fell, cut, and lop recklessly, to bring every log, stump, and stick to market, to dig out the very roots of the jungle, so stopping any chance of reproduction, without thought for the future. There are stories to be heard everywhere of groves and hedgerows, and scattered trees being cut for sale. In the midst of cultivated tracts, there are to be seen bare, sterile hill sides, said to have been forest clad within living memory. In such localities the climate is supposed to have changed for the worse. Beyond the Ghats mountains, in Bellary and Karool, the treeless, shrubless aspect of the country is as wonderful as it is melancholy. These are the very districts where famine has been occasionally epidemic, and where scarcity has been almost endemic. Any thoughtful spectator must perceive that, according to all meteorological experience and to the almost certain teaching of proved facts, these fine districts were not destined by nature to be the prey and sport of famine and scarcity, but have been rendered subject to these calamities by the thoughtless action of man. Even the numerous groves planted in the last generation by Mr. Robertson, whose name is still a household word, were made over many years ago to the villagers and have been mostly cut down. Trees, jungle, and forests must, indeed, be thinned and cut for the use of man, but they need never be exhausted, and something might always be left for reproduction. There is, of course, a Department of Forest Conservancy in the Presidency, and much good is done thereby. Whether its functions and proceedings are fully sufficient for the wants of the country is a question not to be discussed here. At all events, there is reason to hope that the water lands in hill and dale, which are in this Presidency so extensive, might be kept much more thickly wooded than they are, and that large areas now quite naked and devoid of vegetation would, if reserved and guarded, be again covered with trees and brushwood, as they were in former ages. And the successful efforts of individual officers in the past prove what may yet be effected in this way of planting. If the necessity be duly recognized, then there is no doubt of the possibility of devising remedies."

29. The meteorological data available are, however, opposed to Sir Richard Temple's belief that there is any increased uncertainty in the seasons of the south of India, or that the rainfall is either lessening or more precarious than before. But man, by denuding the land of forests is allowing the rainwater to rush off the surface, sweeping away with it the mould, breaking down the bank dams, starving the springs, and draining off the waters of the springs, rivulets, and wells. I have already given* in three columns of 13, 13, and 12 years respectively, the rainfall at Anjanakandy in Malabar, from 1810 to 1847, and showed that the rainfall had

¹ Since Mr. Dalzell and the Honourable Mr. Justice Innes wrote, the general subject has been taken up by Mr. Marsh in "The Earth as modified by Human Action," by Dr. John Croumbie Brown, L.L.D., in his "Water supply of South Africa, and facilities for the storage of it," and by Dr. Brandis in "Ocean Highways" for October 1872.

certainly not diminished there, the average of each of the three periods having been 122·88 inches, 130·10 inches, and 141·33 inches I now furnish 60 years of monsoon rainfall (May, June, July, August, September,

and October) in Bombay, from 1817 to 1876, arranged in periods of 15 years, in which the averages were 81, 70, 77, and 79 inches respectively, the average of the 60 years having been 77·04 inches

Nor has that of Bombay diminished or become more uncertain.

BOMBAY CITY RAINFALL IN MONSOON MONTHS FOR 60 YEARS.

1817 to 1831		1832 to 1846		1847 to 1861		1862 to 1876	
Year.	Inches.	Year.	Inches.	Year	Inches	Year.	Inches.
1817	103·60	1832	74·09	1847	67·31	1862	76·56
1818	81·14	1833	71·39	1848	73·42	1863	80·33
1819	77·96	1834	70·47	1849	118·88	1864	56·60
1820	77·34	1835	62·61	1850	51·15	1865	73·46
1821	82·59	1836	87·99	1851	106·14	1866	92·39
1822	112·22	1837	64·58	1852	75·46	1867	73·57
1823	61·70	1838	50·78	1853	69·65	1868	78·43
1824	33·97	1839	73·62	1854	89·79	1869	115·39
1825	72·24	1840	63·15	1855	35·10	1870	81·06
1826	78·17	1841	71·49	1856	71·08	1871	47·20
1827	81·03	1842	95·16	1857	79·23	1872	87·61
1828	121·98	1843	59·27	1858	61·90	1873	87·42
1829	65·65	1844	65·40	1859	81·84	1874	93·56
1830	71·89	1845	54·73	1860	74·65	1875	88·08
1831	101·83	1846	87·48	1861	106·08	1876	58·93
Total -	1,223·28	—	1,052·21	—	1,161·68	—	1,190·59
Average	81·55	—	70·14	—	77·44	—	79·37

30. In the first period the range was from 39·97 to 121·98, or a range of 88·01 inches.

In the second period the range was from 50·78 to 95·16, or a range of 44·38 inches.

In the third period the range was from 35·10 to 118·88, or a range of 83·78 inches.

In the fourth period the range was from 47·20 to 115·39, or a range of 68·19 inches.

31. The Anjarakandy register shows an augmented rainfall, that of Bombay town shows a decrease of only 2·22 inches in the last compared with the first period, practically there was no falling off.

32. The last and most important statement obtainable is from the Madras Register, from the year 1813 to 1876, a total of 64 years.

Madras rainfall has not diminished, and the seasons are not more uncertain formerly.

MADRAS CITY RAINFALL FOR 64 YEARS, IN FOUR PERIODS OF 16 YEARS EACH.*

1813 to 1828.		1829 to 1844.		1845 to 1860.		1861 to 1876.	
Year.	Inches.	Year.	Inches.	Year.	Inches	Year.	Inches.
1813	45·11	1829	36·87	1845	38·05	1861	37·19
1814	32·41	1830	32·43	1846	79·81	1862	38·18
1815	56·00	1831	44·35	1847	80·99	1863	54·61
1816	41·16	1832	18·45	1848	54·76	1864	47·23
1817	63·56	1833	37·11	1849	39·81	1865	41·64
1818	73·25	1834	39·00	1850	36·88	1866	51·39
1819	36·33	1835	41·47	1851	64·32	1867	24·37
1820	70·01	1836	44·76	1852	72·69	1868	41·43
1821	47·13	1837	49·26	1853	35·82	1869	32·31
1822	59·61	1838	52·33	1854	43·20	1870	74·10
1823	26·62	1839	53·07	1855	32·22	1871	56·35
1824	33·72	1840	58·65	1856	46·99	1872	73·67
1825	56·05	1841	58·32	1857	52·95	1873	51·83
1826	60·73	1842	36·48	1858	48·50	1874	62·90
1827	88·41	1843	50·28	1859	55·14	1875	37·12
1828	37·89	1844	65·36	1860	27·64	1876	21·49
Total -	830·99	—	718·17	—	809·87	—	745·81
Average	51·53	—	44·88	—	50·61	—	46·61

*"The Cycle of Drought and Famine," Dr. W. W. Hunter, p. 21, Appendix A.

33. I have arranged the registered data into four equal periods of 16 years each, and while the total of 64 years averaged 48·5 inches, that of each of the respective periods was 51·53 inches, 44·88 inches, 50·61 inches, and 46·61 inches, and the variations were :—

In the first 16 years, from 26·62 to 88·41, or a range of 61·79 inches.

In the second 16 years, from 18·45 to 65·36, or a range of 46·91 inches.

In the third 16 years, from 27·64 to 80·99, or a range of 53·35 inches.

In the last 16 years, from 21·49 to 74·10, or a range of 53·61 inches.

34. These registered data show that the rainfall in latter years has not been more precarious than before, that the uncertainty of the seasons has not increased, and that the amount of rain falling has not diminished,

35. A writer under the pseudonym of "Philindus,"¹ has arranged the rainfall at Madras town from 1813 to 1875, into three periods, viz. :—

				Average inches.
From 1813 to 1833	-	-	-	47·63
" 1834 to 1854	-	-	-	50·71
" 1855 to 1875	-	-	-	47·04

and, he says, "consequently the clearings of jungle which have been made during the past three-quarters of the century have not affected the total quantity of rain falling, and as the physical effects of drought have absolutely increased in intensity, this increase must be attributed to the removal of those conserva-

¹ "Macmillan's Magazine" for January 1878

the influence which former aspects of the country possessed" (p. 248).

36. The ryot cultivators have had no doubts as to clearing being the cause in operation lessening their water supply. Surgeon Gibson (Bombay Forest Report, 1892-93, page 7) prominently mentioned their views when he was writing regarding the former and recent conditions of the Jyghur Creek, near Rutnagherry. He says, what we now see are merely shoots from the stocks of the old trees. It is, indeed, probable that extensive woods have at one time existed here, as the sheltered sides of the Jyghur Creek, for at least 30 miles from its head, are continuous, well shut in, and not destitute of soil. Under our system of exhaustion without replacement, the sides of the hills enclosing the well shut in valleys are now bare, having been mostly denuded of even the gnarled stocks from which the annual supply of branches for field burning is cut. He tells us that he inquired of many of the cultivators who own the level holms skirting the creek, whether they experienced any difference in the supply of water from above since the wood has been cleared off, and the universal reply to these inquiries (made at different places from separate persons) was, that now the water came down in a lump, leaving the upper lands and the holm fields arid in the dry season, whereas in former years the supply was more gradual and more permanent.

37. For several years past, eminent microscopists have been carrying on in India inquiries similar to those in which Max von Pettenkofer has been engaged. That learned man has recently been writing on the influence of trees in preventing evaporation, also on the purity of the atmosphere, and as to surface and subsoil water. His observations are of so much importance at the present moment, that I give extracts from them here. He says,—"the amount of moisture in the soil of a forest is subject to considerably less variation than that outside. Ebermeyer has deduced the following result from his meteorological observations— "If from the soil of an open space 100 parts of water evaporate, then, from the soil of a forest tree from underwood 38 parts would evaporate, and from a soil covered with brushwood only 15 parts would evaporate." This simple fact explains clearly why the cutting down of wood over tracts of country is always followed by the drying up of wells and springs. "Surface vegetation has also other advantages, besides its use in regulating the moisture in the soil, it purifies it from the drainage of human habitations, whereby it is contaminated and impregnated. If this refuse matter remains in soil destitute of growing vegetation, further decomposition sets in and other processes are induced, not always of a salubrious nature, but often deleterious, the products of which reach us by means of air and water and may penetrate into our houses.

"We learn," he says, "from Ebermeyer's work, that the temperature of the trees in a forest, and even in the tops of them, is always lower than the air in a forest. The shade of a single tree, therefore, cools, not only by intercepting the sun's rays, but also by the effect of gentle fanning. The shelter of a thick wood is cooler than that of an open space exposed to the sun. The air from outside is drawn into the wood, is cooled by it, and cools us again. And it is not only the air that cools us, but the trees themselves. Observation has shown that the trunks of trees in a wood breast high, even at the hottest time of the day, are five per cent. cooler than the air."

38. Thirty years have passed since the subject was first brought under the consideration of the Indian Government, and in the interval many additional facts bearing on it have accumulated. But the information they supply is identical in character with that furnished at the outset, and would have justified wide action to protect the country and its people from ever recurring droughts, scarcity, and famine. After the reports from the Madras officers were received, orders were issued to conserve the forests, to plant trees, and to protect the springs. Conservators of Forests were appointed in all parts of British India, and in, at least, one allied State, that of Hyderabad, in the Deccan. In October, 1877, there were 100 officers of the Conservator grades, and 86 Forest Rangers. On the Neilgherry Hills a rule was enforced prohibiting felling within 10 yards of running water, and a native who contravened it was fined by the Collector of the district. An Act was passed for the control of the forests, and, in 1877 (17th October) an amended Act was, with the approval of the

Home Government, submitted to the Legislative Council of India. Mr Hope, remarking (p. 512) that "without effective regulation and conservation of forests, not merely the public revenue, but the public themselves, would suffer, and even risks of famine would be infinitely incurred."

39. There has never, so far as is known, been any general return published showing the extent to which replanting has been carried. This should now be obtained, and continued annually in future, because, by the latest information, the existing forests are receding. Also, the planting seems not to have had in view the regulation of the rain fall, but to have been of trees suitable for timber, and I have not heard of any attempt to clothe any of the denuded hills in the Ceded Districts or elsewhere. Private persons have speculated in fuel plantations in several parts of the country. Along the Coromandel coast, casuarina trees were largely laid out; planting was made in some places along the lines of railway, and in the Mysore country, and some years since a person writing from Aurangabad mentioned the case of a man who, by a trifling outlay, had planted a portion of waste land, and been able to leave a large fortune to his family. Madras reserved forests area is estimated at more than 5,000 square miles.

40. Only the Governments of India, however, can obtain results commensurate with the requirements of the country, and the need for action is urgent. Dr. Robert Wight gave his views on these points when writing in 1850. He remarked that, "for some time past the opinion has been gaining ground that the climate of a country is considerably influenced by the greater or less extent to which the surface is covered with arboreous vegetation, and that the dryness of the climate of the Carnatic is, in part at least, attributable to its being so generally denuded of forest. To remedy this evil, extensive planting has been authorised. This proposal is worthy of a great and paternal Government, and deserving the highest commendation, for, even admitting, as some suppose, the theory to be erroneous, still an abundant supply of good timber adapted for all purposes will, exclusive of the augmented fertility flowing from the retention of moisture in the soil and the shelter plantations afford, add incalculably to the resources of the country and be of such especial advantage to the Carnatic where timber and fuel are in great request, and shelter from the scorching blasts of the land wind much wanted—as to justify a very liberal expenditure towards attaining so great a boon to the country. Orders having been issued for carrying into effect the plan proposed, it then becomes an important question what kind of trees should be planted? Should large-headed rapid-growing ones be selected as those likely to produce the speediest effect on the climate, or ought those furnishing the best timber and fuel, and, therefore, economically the most valuable to the country, to have the preference? The last, of course, will be those to which the greatest favour will be shown, but they cannot be exclusively taken, it being necessary, on the known principles of vegetable physiology, towards ensuring success, that the plantations should be of a mixed character, and must, to some extent, include bad as well as good, but the majority should be of the latter description."

41. Thus wrote Dr. Wight 28 years ago. But, while carrying out his suggested principle of variety, two distinct kinds should, invariably, be brought together, one of fast growth to shoot up and shelter the other and more lasting slow growing trees. The Committee of the British Association enumerated several trees which they deemed desirable to have planted, amongst others, the (1) Mango, (2) Banyan, (3) Popul, (4) Tamarind, (5) Dhak, (6) Wild Jujube, (7) Babul, (8) Scorus, (9) Sissoo, (10) Teak, (11) Bamboo, all of them useful, and such as may be largely planted. Plants with large, tough, thick, glossy leaves, condense the vapour in the atmosphere more rapidly than any others. The portia tree (*Thespesia populnea*) drips abundantly in a morning fog. The various neem trees, species of *Azadirachta* and *Melia*, are in full foliage in the very height of the hot weather. It is in the hottest season of the year, March and April, that the mango tree throws out its blossoms and young leaves, maturing its fruit in June. The

¹ "Proceedings of the Madras Central Committee for the great Exhibition of 1851," p. 180.

² These are the (1) *Mangifera Indica*, (2) *Urostigma Bengalense*, (3) *Ur. religiosum*, (4) *Tamarindus Indica*, (5) *Butea frondosa*, (6) *Zizyphus jujuba*, (7) *Azadirachta*, (8) *Albizia lebbek*, (9) *Dalbergia sissoo*, (10) *Tectona grandis*, (11) *Bambusa* species.

¹ "Contemporary Review," December 1877, pp. 68—81.

several species of *Eucalyptus*, from Australia, grow with great rapidity on the Neilgherry Hills, and may be largely utilized. Some plants, like the cooltee (*Dolichos umbellatus*), are brought forward in the cold season of the year by the night dews.

Protection
for growing
plants
needed.

42. Philindus says (p. 253), the cost of planting by the Madras Forest Department, during 1874-75, was (excluding teak) about 5l. per 1,000 trees, and he mentions 80,000 square miles as about the area requiring to be planted with trees. Protection for the growing plants is, also, a great present and future need. The earth has in its bosom myriads of seeds and roots which would shoot and grow into trees and shrubs and grasses, if man and the flocks and herds would only permit. It is wholly unnecessary to experiment on this point, for I know that protection would effect a great and immediate change, but if any doubts on the subject be felt, the south-west monsoon begins in three months, and a strict conservancy may be established in several hills in various parts of the country, and the result reported at the close of the south-west monsoon, and again when the north-east monsoon is over. In the meantime plants and seeds can be gathered in from all parts. I think that no species of the pitcher plant grows in the peninsula. It may be doubted if there is in the south of India a dozen of the travellers' tree, though the plantain (*Musa paradisiaca*) grows wild in the Western Ghats.

M. Pautrat
names the
trees most
useful.

43. A writer in "Science Gossip" says that, "from observations by M. Pautrat, relative to the comparative influence of leafy woods and resinous woods on rain and the hygrometric state of the air, recently communicated to the Paris Academy, it appears that pine-forests have a much greater influence on the hygrometric state than others, so that if the vapours dissolved in the air were apparent, like fogs, we should see forests shrouded in a large screen of moisture, and in the case of resinous woods the vapoury envelope would be more distinct than in that of leafy woods. M. Pautrat also shows that pines retain in their branches more than half of the water which is poured upon them, whereas leafy trees allow 58 per cent. of the precipitated water to reach the surface of the ground. He suggests, therefore, that in planting with a view to oppose inundations, it would be advisable to choose by preference resinous trees as offering a better covert."

Dr. Brown
notifies the
important
trees.

44. This point, however, appears to need some further investigation. Dr. J. C. Brown seems to be of opinion that some trees evaporate and some condense moisture. He notices the tree of the Ferro Islands which attracts a cloud and drips, and another tree in Asia Minor with similar action, and mentions² that in Europe the most copious humidity or moisture has been produced by the elm, and in decreasing order by the poplar and horse-chestnut, whilst the least effect is produced by the fir.

Mr. Robertson's
experiments on
the absorbent
capacity
of soils.

45. In connection with this subject, I may draw attention to Mr. Robertson's renewed experiments on the absorbing and retentive powers of soils. The red or black cotton soil of India is familiar to all who have been in that country, and it is reckoned one of the best of the soils. During the dry season it rends into great cracks in every direction, but, during the rainy season, it presents a uniform glazed surface of black tenacious clay, marching over which is an impossibility. Why the great rents become thus closed is shown by Mr. Robertson's experiments to be owing to the great capacity this soil possesses of absorbing and retaining moisture. He tells us (p. 35) that it is capable of holding more than one-third of its entire weight of water, and that it has, in a very remarkable degree, the power of absorbing moisture from the air. In one night black soil absorbed $1\frac{1}{4}$ per cent. of water, but sandy soil only $\frac{1}{4}$ per cent. And in another experiment he found that thoroughly dried cotton soil, exposed to an atmosphere saturated with moisture, absorbed 7.99 per cent. of water during a night. Drs. Macleod and Christie, Captains Allardye and Newbold, all noticed this character in the black cotton soil.³ It is that in which the cottons, the sorghum, the wheats, and maize are grown. In many parts it is 15 and 20 feet deep, and probably, it might be largely used as a layer over the less retentive and less absorbing soils. Manure is not available in that country in anything like the needed quantities, and water in many of the higher

Black cotton
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its great
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other crops.

lands cannot be readily or cheaply provided, but this cannot be any difficulty in covering the red, and grey, and calcareous soils with a layer of the black soil. It is to be had in almost every part of the inland country, in smaller or larger quantities, and covers the whole surface of the greatest outburst of volcanic rocks in the world, in the western part of the Deccan, Central Provinces, and Berar.

46. The ryot rarely provides pasture fields for grazing in the immediate vicinity of large towns patches of Sorghum vulgare (juar, cholum) sown thick to furnish green food, may occasionally be seen, but the usual custom is to drive the horned cattle, the sheep, and goats to pick up what they can get on unoccupied or fallow tracts. In this respect the practice in India is virtually the system of the sheep runs of Australia, where, however, four acres are allotted to a sheep, and in India everything disappears under the number of the flocks and herds, and, in the vicinity of towns and villages, horned cattle and pigs eat up refuse greeds. I write from memory when I mention that in the open parts of Australia four acres per each sheep are required for the suitable rearing of a flock. In the summer pastures of England, between London and Bristol, one acre is necessary for one of the horned cattle with sheep, but Philindus calculates (p. 255) that on every available acre in the Madras Presidency there are 1 horned cattle, 1.35 sheep and 2.7 goats.

47. Also, throughout all India, besides the destruction of much grass by the close cropping of the fields, much is destroyed by the mode in which fodder is obtained for horses. The valuable harish grass (*Cynodon dactylon*) grows abundantly over most parts of the country, but all through the hot weather, when herbage disappears, its very roots are dug up to provide fodder for horses. Deprived of all vegetable covering, it is not to be wondered if the earth dries up. The day may come when pasture fields will be laid down for herds, and their early adoption should be encouraged. Already, in New Zealand, grass seed has been introduced from Great Britain, and, it is said, thrice as many sheep are now being fed on an acre. Moorcroft recommended a trefoil which he found the people of Asia using for their cattle. There are, however, plenty of grasses from which to select, and consciousness of necessity for using them alone is wanting. The farmers of India and the villagers generally are, however, wasteful in many ways, and they might seem to make much more of the natural grasses than they at present.

48. Mr. Robertson has pressed this point, and Major C. McClure, the officer in charge of the Amrat Mahal cattle breeding establishment at Noonsoor, in Mysore, remarks that Mr. Robertson's belief regarding the mismanagement of grass lands by ryots tallies completely with his own experience. He says, "It is lamentable to observe the wanton destruction of pasture on the one hand, and on the other the apathy displayed by the natives in securing the enormous quantities of excellent jungle grass which is annually burnt or otherwise lost. I cannot even get surplus kharif grass cut and stacked on the condition of giving the workers half of it for their own use. With a gang of Tamil coolies at my disposal and the use of the Government elephants, I could stack any quantity. No doubt," he adds, "the increase of cultivation has diminished the waste lands formerly used for grazing, and eventually this will become a very serious question, but in the meantime, and for many a year to come, there ought, with the most common care and forethought, to be ample grass for the present needs of five times the number of cattle in the country, and to provide a reserve of hay for such seasons as the one through which we have just passed."

49. Mr. Robertson mentions that in the Coimbatore District a few of the villages retain in their vicinity lands for pasturing their flocks, but take no care over the grasses growing on them, which are perennial and in tufts.

50. The pastoral races annually fire the grass and under shrubs in all the forest and hill tracts where their herds and flocks graze. The extent to which this is practised, and the distances of the places affected by it are scarcely to be realized by Europeans. On one occasion on the Irawadi, near Prome, I observed flakes falling on the deck of the steamer from forests burning, it was supposed, miles away. On two of the occasions of my sailing through the Malay Archipelago, I saw the forests of whole islands on fire. On one occasion,

¹ "Hardwicke's Science-Gossip," No 158, February 1st 1876. "The Influence of Trees on Rainfall."

² Dr. John Cronan Brown, L.L.D., "Forests and Moisture," Edinburgh, 1877, p. 37.

³ "Madras Journal of Literature and Science," October 1886, p. 472.

¹ "Pioneer Mail," 16th February 1878.

when travelling from the Woon to the Bassim district of Berar, the whole of the hill summits around me, so far as the eye could see, were on fire. The destruction by such fires of young trees and shrubs is an annual occurrence, and it should be sternly repressed.

It will be necessary to exclude wood-cutters, cattle, and sheep and goats from tracts allotted for the growth of trees or underwood, or grass. Darwin's theory urges the need for preventing cropping by cattle and for enclosing tracts on which it is desired that trees should grow.

52. Throughout nearly all the interior of the peninsula of India, from Bangalore northwards to Nagpore, the winter crops are reaped in January, February, and March. The fields have no permanent enclosing hedges or trees, but the cultivators annually enclose the roadside parts of their holdings with branches of the babul tree (*Acacia Arabica*), which they burn when the crops are off the ground. They do not wish to have hedges or trees, as those tracts are 1,300 to 2,000 feet above the sea, and the crops of the winter season need all the sunshine they can get. Whilst the crops of sorghum, wheat, &c., &c. are on the ground, no sight can be more lovely, but when harvest is over the view is one of desolation. A traveller who recently came to Madras, at the bare season of the year, remarked that he had come to the world's end. Another who saw Berar at the close of the harvest, said it was the most God-forsaken country he had seen, and a third traveller from Europe was at a loss to understand whence the Government drew their revenue. It will not, I think, be possible to induce the cultivators to have hedges or trees at the sides of the fields where cold weather crops are grown, but there are abundance of unoccupied places which could be advantageously planted with trees and shrubs.

53. Shelter from dry hot winds is needed for all growing plants and to prevent desiccation. A dry wind causes very rapid evaporation, a hot dry wind, in a few days, will lick up all the moisture on the surface of the ground, which cracks and rends under the drought, and shallow tanks dry up, the bottom becomes heated under the sun's rays, evaporation rapidly proceeds, and a hot dry wind blowing over the surface carries off the rising vapour. All tanks should be girt with trees on the sides from which hot winds blow. It is not required to have a great number of trees. A quarter of a mile of a tank under lee of a single tree, 16 or 20 feet high, will lie unruffled by the wind.

54. The communal system of British India presents difficulties in the way of settling the non-Aryan races in the waste lands of villages. These classes form the bulk of the agricultural labourers. Although in many districts there are customs current which prove that the non-Aryans were settlers prior to the appearance of the present Hindu holders, only at one Deccan village, and that in the Hyderabad dominions, have I ever seen a village Patel of the Dher or Parah caste. Many of these races are migrating, even to distant countries, in search of the employment and food from which the communal rights of the Hindu holders are depriving them. Yet India cannot spare its population, and its lands could support much larger numbers than now. But the non-Hindu population of some districts is increasing with such rapidity that they are emigrating, and, as the provision of more food is even now a question of importance, the attention of Government ought to be given to devising means by which non-Aryans could hold land. Oudh, Bengal, and the North-Western Provinces are well peopled, but other districts have only a scanty or even a sparse population, as the following memorandum of the number of souls on each square mile will show:—

Oudh	468
Bengal	397
North-West Provinces	378
Madras	226
Mysore	187
Punjab	173
Bombay	131
Berar	129
Ajmir	119
Assam (excluding hill tracts)	99
Central Provinces	97
Goorg	84
British Burma	31

1 "On the Origin of Species," 3rd Ed., pp. 74, 75.

And, in the Madras Presidency, the average number of persons to the square mile are as under:—

Madras City	14,724.1
Tanjore	540.1
Malabar	376.7
Arcot, South	360.3
Trichinopoly	344.5
Chingleput	340.7
Tinnevely	327.3
Arcot, North	282.3
Salem	262.9
Godavery	255.9
Madura	238.5
Coimbatore	237.3
South Canara	235.4
Ganjam	182.9
Kistna	180.7
Nellore	162.7
Cuddapah	161.5
Bellary	151.5
Kurnool	130.4
Vizagapatam	117.7
Neilgherry Hills	66.0

55. These figures are instructive. Tanjore prior to Tanjore, British supremacy possessed large irrigation channels, the most leading from the Cauvery and Coleroon, and these best improved by Colonel Sim and Colonel Cotton. It now supports a larger population than any other Ceded Districts, the Madras district, and the three revenue districts, Bellary, Cuddapah, and Kurnool, into which the Ceded Districts have been arranged, stand out in strong contrast to it. These three, with one exception, are the scantiest peopled, and are the most arid of all that southern region. To remedy the want of humidity, the waters of the Tumbudra might be more largely utilized than they yet have been. It is the great river needed, of the Bellary and Kurnool collectorates; but, running as it does through a greatly denuded country, channels and reservoirs are both required, for there is now neither tree nor shrub, nor grass on the bare stony hills to retard and equalize its flow. In one time, it is in rapid, even dangerous flood; at another its bed is dry, it comes down past Kurnool with sudden rushes, my house was built on the brink of the right bank, and in 1847 (or 1848) a woman, whom I saw crossing on foot its almost dry bed, was overtaken by a wall of water and drowned. Its waters are abundant; its catchment area is about 20,000 square miles, and its flood discharges at Kurnool 270,000 cubic feet per second. When the Madras Irrigation Company planned their great work on the Tumbudra, they had also in view a further irrigation scheme, and expended, as was mentioned to me, Rs. 40,000 in taking the levels of a tract through the Bellary district from higher up the river than Sankosula, the head of the Kurnool scheme, but, not seeing their way to complete another canal, they transferred their surveys and plans to the Madras Government. If my information on this point be correct, the projected canal scheme could now be resuscitated, seeing that irrigation channels and reservoirs are largely needed in that arid region. That Company planned their canal to combine an irrigation and navigation channel. It is a grand work, over 100 miles long for the state of the people, for the minimum section of the canal in the first 75 miles has a 100 feet bottom breadth, and the great desideratum in the Ceded Districts is irrigation. To aid in providing this, the prominent hills in the Bellary district should be guarded, and the entry on them of wood-cutters, cattle, or sheep, also all burning of grass, strictly prohibited. There are many hills in the district on which grass and shrubs, and trees would shoot up, if cropping, and cutting, and burning were prohibited; groves also could be planted successfully in many places, and all three districts so improved as to support a larger population than 150 to the square mile, as now. The Ceded Districts have been great cholera seats, and von Pettenkofer would point to the want of plants as a probable cause.

56. Besides the settled non-Aryans, there are, in all parts of India, numbers of homeless races; in the Tamil, Telugu, and Kanarese countries, not fewer, perhaps, than 100,000. Their history cannot be traced, but they are contributing nothing for the support of themselves and others; indeed, most of them are predatory. They are not inclined to mix with their fellow men, and tact and patience will be required to withdraw them from their migratory habits, and induce them to settle down to agricultural pursuits and become producers. Surgeon-Major Short, of the

Peninsula is sparsely peopled.

Frontier
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lands and
milder cli-
mate, and
cannot be
permanent-
ly repressed.

Forest laws
should be
introduced
into allied
States.

Moving
sands to be
bound
down, Ja-
cobabad an
illustration.

Madras Medical Department, was able to initiate this good work with one of the races on the East Coast, perhaps the most suspicious of all. In connection with this it may be mentioned that, from the year 1860, the question how to people Burmah has been constantly under consideration, and unsuccessful efforts to induce immigration have been made; yet non-Aryan races are pressing into Assam to obtain culturable lands and a milder climate, whom a second Cleveland could lead to the unoccupied tracts in the south, and much of the restlessness of the frontier tribes is the result of their cramped position and natural craving for more land and more food, and their strivings to obtain these can never be permanently repressed.

57. Also, any efforts which the Governments of India may make to conserve the forests, and protect the springs and river sources should not be restricted to British territory or to Government forests, but allied and feudatory States likewise should be asked to introduce conservancy and planting. Already rules exist for controlling private forests, but there has still to be introduced a system for the protection of the forests in Native States where many rivers have their sources.

58. To bind down the moving sands from river beds, and sea shores, and deserts is also a matter meriting attention, in order to prevent the submersion of arable land. Something might be done for parts, at least, of Rajputana, and for parts also of the Indian deserts, by providing irrigation channels and reservoirs, and by planting sand-binding plants. A recent writer mentioned that "at the extreme north of the district of Jacobabad, in the vicinity of the outposts, is desert plain, breaking occasionally into sand hills, but the cultivation is gradually reclaiming this land, and there is every prospect in a few years, as the canals are opened out in this direction, that the present barren, desolate appearance will be changed for fields of corn." This seems to have been the state of that cantonment until the year 1844, when a canal was led into it from the Indus, and Dr. Brandis writing in

1872, at page 95 of "Ocean Highways," mentions that now the plain is a dense forest of bābūl and other trees, upwards of 60 feet high, sheltering the houses and gardens. He tells us that "a ride of a few miles takes you into the desert which skirts the hills of Baluchistan, a level plain of splendid, fertile, alluvial soil, but hard, naked, and barren like a threshing floor, without shrub, herb, or grass, except in the vicinity of the canals, where vegetation is rich and luxuriant." There are many lands in the south of India needing a similar care to that given to Jacobabad.

59. When writing in 1840 and 1848, the data available justified the opinions which I then advanced, that the rainfall is as abundant as ever, but that countries denuded of their vegetable covering have no means to husband it or regulate its flow. In now again writing on the subject, I have had in view to give a *résumé* of what the Indian Governments have done since it was first under their consideration, to place on record the data that have since accumulated, with deductions therefrom, and to direct future attention to urgent economic points. In now concluding, therefore, it may be confidently stated that in India, within the present century, the rainfall has not diminished, nor has the quantity annually falling now become more uncertain, but that man, partly ignorant and wholly reckless, has denuded the soil of its trees and shrubs and bared the surface to the sun's rays, thus depriving the country of its conservative agents, and making the extremes of floods and droughts of more frequent occurrence and more severe. I have now, however, shown that measures, many of them inexpensive, can be easily adopted, which will early supply a more equable supply of water in the rivers, canals, and reservoirs, permit cultivation and population to increase, and render scarcity and famines of less frequent occurrence, whilst the bursting of tank bunds, and the destruction of bridges and roads, will be in some measure averted, and lives, and property, and revenue saved.

EDWARD BALFOUR, Surgeon-General.

2, Oxford Square, Hyde Park, London.
20th February 1878.

¹ "High Asia," Part I., vol. ii., page 3.

V.—PRINCIPLES OF FAMINE RELIEF.

Notes of a Discussion which took place at Simla in September 1878

Mr. C. A. Elliott, 17th September 1878.—The question which I propose for discussion is the following: supposing it possible, in any Province, in a year when the crop has failed, to make a fairly correct estimate of the extent of the failure, and of the deficiency of produce below consumption, what forecast ought the Government of that Province to make of the numbers likely to require relief and of the measures which it will be proper to take for the relief of famine? Is it possible to establish, even approximately, any relation between the extent of failure, the extent of the distress consequent thereon, and the extent of the measures to be taken for the relief of that distress? If not, by what principles ought a Government to be guided in its treatment of a famine—(1) when threatened, (2) when established?

To illustrate the subject to be discussed, I give some

figures regarding the two places in which the respective Governments have gone to the two opposite extremes in their treatment of famines—the Darbhanga district in 1873-74, and the Mysore Province in 1876-77. The following table attempts to show the outturn of food-grains in average years, and in the years of failure. The Darbhanga figures are taken from Mr. MacDonnell's report, the Mysore figures from my own calculations. They cannot claim to be more than rough approximations, and may even not be that, but for the sake of the present argument, I would ask that they should be accepted as such and no more; it is at least within our reach to attain this amount of agricultural knowledge, and if we do not possess it now, we ought to endeavour to attain it before the next famine is upon us.

THE FIGURES FOR FOOD-GRAINS ARE IN TONS, THREE O'S OMITTED.

	DARBHANGA. Population 2,400,000.		MYSORE. Population of 1875-76, 5,000,000.				
	Average year.	1873-74.	Average year	1875-76.	1876-77.	1877-78.	Total of three famine years.
Outturn of food-grain - - -	882	301	1,543	930	514	743	2,187
Consumption of food - - -	544	364	1,071	828	771	614	2,213
Seed-grain - - - - -	50	50	64	56	56	56	168
Wastage at 5 per cent. - - -	44	15	77	46	25	37	108
Total consumption - - -	638	428	1,212	930	852	707	2,489
Surplus or deficit - - -	244	-127	331	0	-338	36	-302
Value of surplus or deficit in lakhs of rupees - - - - -	136	-142	188	0	-380	+60	-320

The Bengal Government estimated the outturn of the crop at less than the figure here shown, and the failure as greater. They calculated the quantity of food that would be wanting for the year's consumption, and poured it in, assuming that private trade would not supply the void. They estimated that an immense number of people would be without food, or the means of purchasing it, and they devised a scheme of supervision and inspection (one superior officer to each circle of 100 villages, one inferior officer to each sub-circle of 10 villages), which was meant to be, and in fact was, perfectly efficient for the purpose of distributing food, distributing money, employing labour, and relieving distress in every form. The result was that the relief was overdone, nobody died, but an immense expenditure was incurred. The district lost in agricultural produce about 278 lakhs, and the State spent 79 lakhs on its relief. Very possibly a much smaller sum would have sufficed to produce the requisite effect.

The Mysore failure was infinitely severer, for it lasted, with varying intensity, over three years, though only in the middle year (1876-77) was the loss of crop as complete as in Darbhanga. The Mysore Government esti-

mated the loss of the crop at the same figure as I have done, but they made no calculation of the defect of food-supply below consumption, nor of the extent of the distress which this defect indicated, nor of the numbers of people whose distress would have to be relieved. They left each district officer to take the initiative by asking for such sums as he thought necessary for small relief-works and for gratuitous feeding, and they resolved that these two measures alone were sufficient for the relief of the famine. Consequently, when they found the numbers on the relief-works continue small, they did not argue that the works were failures, but having no standard of what the numbers ought to be, they concluded that there was but little distress. The result was a very moderate expenditure and a very great mortality. It is more than probable that no conceivable expenditure would have stopped all the mortality.

The following table shows the amount of relief given in Darbhanga during the five months of acute famine, the amount given in Mysore during the 11 months of acute famine, and the amount which would have been given in Mysore had the ratio of relief to population been the same as in Darbhanga:—

	DARBHANGA.		MYSORE.		MYSORE.	
			Actual Relief.		Proportionate relief on the Darbhanga ratio.	
	Average numbers for five months.	Cost.	Average numbers for 11 months.	Cost.	Average numbers for 11 months.	Cost.
Gratuitous relief - - -	144,944	Rs. —	90,575	Rs. —	330,000	Rs. —
Relief works - - - -	305,025	—	56,307	—	693,000	—
By loan of money - - -	11,725	—	—	—	26,650	—
By loan of grain - - -	216,712	—	—	—	492,500	—
Total - - - - -	678,406	79,00,000	146,882	60,75,000	15,42,150	3,96,00,000

I have omitted the cost of the grain imported into Darbhanga and sold to the public, as such a relief measure would have been out of the question in Mysore. But the result to which the table points is, that if the Darbhanga precedent had been followed, the cost of relief during the 11 worst months would have been four millions of money, including establishments and all expenditure, the State would have disbursed five millions sterling. With this outlay (and so far as Bengal was extravagant with probably less outlay) the lives of most of those who died of famine would probably have been saved. Certainly half a million, perhaps three quarters.

These are the two extreme cases on record—of extravagance in relief on the one hand, of economy on the other. Whatever principles are adopted in the future must probably lie between these extremes.

The aim apparently should be to secure a certain amount of efficiency in the administration of relief: to

be able to say for instance, in each Province,—there has been a loss of 50 per cent in the crop; that implies that there is enough food in the Province for all the population at minimum rates, but so many hundred thousands will have no money to purchase food and no market for their labour; therefore the State must provide by relief-works an artificial market, so that they may earn the money. Similarly, if the loss of the crop is 40 per cent. or 75 per cent., there should be a sliding scale of the numbers who will be affected. On the other hand financial considerations come in: the Province must not spend more than it can pay, and possibly relief-works to the extent here sketched out would land the State in bankruptcy. Is it possible to reconcile these opposing considerations and to decide what the fundamental principles of relief ought to be?

Supposing this subject to be threshed out, we might then go on to discuss what kinds of relief measures should be adopted to carry out those principles.

Mr. C. A. Elliott, 20th September 1878.—At General Strachey's suggestion, I put on paper the opinions I hold as to the subject discussed on Wednesday night, after having heard the views of others. This paper will then be sent round to the other sharers in the discussion, who will be invited kindly to record their own opinion also.

The question put was of this nature. Suppose that in any province a drought has occurred, and a crop been wholly or partially lost: the district officers make an estimate of the number of persons likely to stand in need of relief in order to purchase the food which will have to be imported, or to supply the deficiency of a market for their labour; the Head of the Government, on reviewing these estimates, finds that they imply an expenditure which cannot, in his opinion, be borne by the province: what is he to do, and what principle ought to govern his administration of measures of relief?

It is allowed that such a case may arise. The outside limit of admissible expenditure is such a sum as could be recovered by extra taxation in the province, and could be paid off, principal and interest, before the next famine arises. And such extra taxation must not be so heavy as to crush the energies or stop the improvement of the province; otherwise the remedy for famine might be worse than the disease.

At the same time, my feeling is that it would be impossible for the Head of any Government openly to proclaim such a limit. To say to his district officers: "Your estimates imply an expenditure of (say) five millions, but the province can only bear an expenditure of two, and you shall have this money distributed among you rateably, and when it is spent you must close relief and let the people shift for themselves," would savour of inhumanity and revolt the feelings of civilized people.

It seems, however, to be generally agreed that though the case put might arise, it never yet has arisen, or, at least, never ought to arise. Where the expenditure has been beyond the power of the province to repay (as in Bengal, 1874), that was due to a lavish administration of relief. If the relief had been made more uncomfortable, and severe tests imposed on applicants, the expenditure would probably have been kept within due financial bounds. Under such treatment there would be no waste; at the same time, complete immunity from starvation, and its concomitant diseases, would not be obtained. The Government must give up the idea of "saving life at any cost," and of "holding district officers responsible that no mortality occurs."

Perhaps the principle may be formulated thus: The Government of a province should adopt such measures of relief as will be sufficient to enable every one who

accepts the conditions attached to them to save his own life; such conditions being severe enough to keep off all who are not in acute need of relief, and the Government, judging by past experience, may rely that such measures will not involve an excessive expenditure beyond the power of the province to bear.

But then it must accept the responsibility of a mortality which will be greater or less according to the severity of the famine, and the local conditions. It must acknowledge that the tests which keep off undeserving applicants will also keep off some who are in real distress. And it must be prepared to face and contradict the cry that increased death rates (up to a certain limit) mean unsuccessful administration. The campaign against famine, like other wars, if properly conducted must have its butcher's bill.

The position maintained by several sharers in the discussion was, that the principle of local responsibility should be relied on to enlist the people themselves on the side of economy. I was hardly able to understand the practical application of this principle, and so far as I do understand it, I feel inclined to disagree with it, so that I trust it may be more clearly expounded by its advocates than I can do. But the view seemed to be this, that it ought to be made generally known that the cost of famine relief (or at any rate a part of it) will be recovered by special taxation from the district or area relieved. Each district should be divided into circles (whether tahsils or taluks, municipalities, or whatever suits the local conditions best) over which should be placed a committee of local notables headed by a Government official, who should be held responsible for the proper administration of relief in their own circle: a strong central driving power should supervise them and force them to be efficient, and the knowledge that they will have to pay for the cost of relief should force them to be thrifty. If this is a correct statement of the anticipated practical working of the principle, I should express the following grounds of dissent: (1) that a machinery not ordinarily at work, but started *ad hoc* whenever an emergency occurred, would probably not be an efficient aid, but only a clog on the movements of the Government officials; (2) the main effect which a sense of financial responsibility would have on the local notables, would be to make them wish to refuse all relief at all, and secretly to do all in their power to render relief measures inefficient. Every good district officer will obtain the co-operation of the best of his rustic notables, and often he will find it a valuable aid; but the main reliance of Government must be on its official staff, and we cannot expect to carry on administration at a time of severe pressure except by strengthening that staff.

General Strachey, 22nd September 1878.—In what follows it is to be understood that when I speak of the State, I mean the Government acting in behalf of the community. Also that, unless the context shows that it is not so, I leave on one side the questions of how practical difficulties are to be met, and of disturbing influences such as the pressure of public opinion in England or India.

Broadly speaking, there is a necessary limit to the sum the State can spend on pauper relief in time of famine, based on financial considerations. There is a point beyond which taxation cannot go, and in the end

the relief must be supplied by taxation, whether money is borrowed for the purpose or not.

Viewed otherwise, a similar conclusion is arrived at from the facts of the case. The object being to save the population from misery and death, the problem to be solved is, where will the results of the regular pressure of increasing taxation be equivalent to that caused by the irregular occurrence of famine.

It need hardly be said that no practical means exist of solving such questions as these. The only reply that can be got must be "ambulando"—it must be obtained by experience. But though this is the case

it is not the less necessary to bear the fact in mind, that there is a necessary limit to the grant of relief.

The sort of calculation Mr. Elliott has suggested will furnish an approximate estimate of the probable demand for relief in a purely agricultural community, in which labour produces no exportable commodity that can be exchanged for food, which is pretty much the case in most parts of India. There will, of course, be great difficulty in estimating the effect of stocks on the supply of food after a failure of the harvest, but it may safely be assumed that as the produce approaches the minimum quantity required to feed the people, prices will rapidly rise and great pressure will be brought on the poorest classes which live from hand to mouth, and have neither stores of grain or money to fall back upon.

In this manner these estimates will certainly furnish useful guides to the Administration as to the probable severity or otherwise of distress arising from failure of crops; and without being of a nature to give any definite indication of the sums likely to be required for purposes of relief, they will afford valuable aid in the shape of warnings that precautionary measures on a certain probable scale of magnitude may be necessary.

I quite agree with Mr. Elliott that we have no means of fixing any sum, by help of these estimates, or otherwise, which shall be declared to be the amount that may properly be spent in relief and beyond which public expenditure on this account should not be permitted to go. All this is clearly impossible, and no question of humanity or policy in fact arises in relation to any such suggestion, if it ever were made, though I don't think it ever has been.

Accepting, as it seems to me we must accept, the general principle that every community is bound to co-operate for self-preservation, what we have to do is to endeavour to find some practical plan by which this may best be accomplished under the conditions of an Indian famine. A plan which should amount to a communistic distribution of property and bringing all down to one level of misery evidently will not do. Unlimited offers of relief are therefore precluded, and tests become necessary to distinguish between those who really require relief and those who do not. That the application of tests may in some cases lead to mistakes, and to consequent evils including even some loss of life, I shall not attempt to deny. But such evils must be weighed against those that would arise from rejecting tests and entering on a course of indiscriminate relief about giving which would be alike financially and morally ruinous to the community. In a human society, as in any other respect the principle of self-protection is essential to its continued existence.

This brings us to consider by whom, and under what conditions, should relief be offered and tests applied.

As India is now situated, it is impossible to doubt that the Government must accept the responsibility for the organization of relief measures when they have to be undertaken on a large scale, nor is it likely that this condition of things will soon change.

But though this be to a great extent now inevitable, it by no means follows that we should be content to leave things as they are if any better plan can be found.

Indian experience shows us that our course lies between two great difficulties—on the one side excessive expenditure with consequent heavy increase of taxation; on the other, insufficient or ill-applied expenditure with great loss of life. Experience has equally taught that profuse outlay alone will not prevent great misery and destruction of life.

As Lord Salisbury observed in relation to the Bengal famine the business of the community is to protect itself. The business of the State is to see that all obstacles are removed that would interfere with this, and all needful help given that will facilitate it. It is not the function of the State to feed the people, but only to see that they mutually aid one another in doing this, in a manner that is compatible with the existence of a prosperous community, and that the obligation is so far as necessary enforced.

The fundamental idea then that should regulate the form of all relief is, that it should be as far as possible localised, that the sense of mutual responsibility among the members of the community for their support should be maintained, the liability to bear the cost being combined with the obligation to prevent extreme misery or death as far as possible.

That the application of such a principle in the present state of India will be difficult, I readily admit, and that its extension will be slow is no less certain. But I feel

satisfied that it is in this direction that our efforts should lie.

The Government of India has in a measure recognized some such views. The first step in the way of introducing the idea of local responsibility has been taken by making the Provincial Governments liable in the first instance. It remains for the Local Governments to extend this local liability to the towns and provinces under them.

It will undoubtedly be quite impossible to start from the extreme of centralized administration to an extreme of decentralization. Where in fact no organs of local self-government exist, they certainly cannot be created *ad hoc* for such a purpose as this. But in the towns the municipal bodies are in most parts of India acquiring some powers of local management, while they also exercise some powers of local taxation. Their operations are, no doubt, to a great extent, carried out under the supervision of Government officers, but so far as this is the case, those officers must be regarded as the representatives of the people, and to some considerable extent in all such cases the interests of the local community are properly represented, and possibly better represented than they otherwise could be.

I can see no serious difficulty in establishing a rule that all town relief shall be conducted under the municipal bodies, and on their responsibility. The question of their financial ability to meet from local sources the burdens that would arise in extreme cases, is one distinct from that of their ability to discharge the administrative duties. If we establish a first step towards local management, it will be a great gain. And the financial difficulty does not seem to me at all insuperable.

It would be easy to arrange that within certain limits the locality should provide by local taxation for the supports of its own destitute population. In time of unusual distress the Provincial Government could supplement the local resources on some system under which the debt incurred by the locality should be discharged subsequently either wholly or in part. The extent of local taxation for poor-relief might be limited by law, and a part of the existing famine taxes lately put on might be assigned to the localities where they were raised, so as to avoid present additional taxation. So far as by the assignment of such taxes, the liability to future relief charges could be removed from the general revenues and placed on the localities, their surrender would not be financially objectionable. Under such a system, extended to the rural districts as well as the towns, the Provincial Government would have to bear the whole liability for famine relief within its territories, in time of need receiving and from the Government of India, and discharging debts so incurred during the periods of prosperity.

To extend such a system to the rural districts would no doubt be difficult, and would for some time to come at least amount to placing the responsibility on the local district officers. But in fact the burden lies here under any circumstances, and it would, I venture to think, be found that the reality was not greatly altered, and that it was chiefly the form that was changed.

Whatever arrangements are now necessary under a centralized system, for strengthening the local administrative staff in time of severe distress, could without the least difficulty be modified so as to meet the wants of a more decentralized system.

I do not believe that the persons responsible for giving relief under a system, which was based on the ultimate local liability of a district to pay for itself, would be more likely to let people die of starvation than those similarly responsible under the present system. In England Boards of Guardians do not let paupers die. But I do think that by degrees a sense of the urgent necessity for preventing waste would be created which has comparatively little existence now, and that the pressure of local taxation required to meet profuse expenditure would raise a feeling among the responsible administrative officers, as well as among the actual taxpayers, that would have a very wholesome effect.

I may, perhaps, specifically guard myself against being supposed to suggest that the local shop-keepers and landed proprietors should be made the administrators of a relief law in India at present. Nothing is further from my views. But our plans should be so laid that as these traders and proprietors become competent to discharge such a duty, the machinery should admit of their taking a part in it, and whatever development can be given to the feeling of local responsibility and liability should certainly be attempted.

Whether in the towns or villages, the provision for meeting famine relief in all its stages of development

should be understood to form an essential part of the Local Administration, and the authorities charged with that administration are those who should be held responsible for all relief operations. In the towns the municipal bodies, and in the districts the local committees headed by the chief district officers. As the popular element in these bodies become strengthened and increases in intelligence, so will the people gradually be brought to participate in this branch of administration as in others.

The necessary corollary of such a conception as I have of the system of relief that we should aim at, is the formation of a central department to control the local relief operations, to give them consistency and regularity, and to exercise over them the needful financial control. In such a department would be concen-

trated the results of the experience gradually gained in such operations, and on it would rest the responsibility for watching the condition of the country and warning the authorities concerned as to probable serious distress, as well as for being prepared with plans of action in case of necessity. It would, in fact, be the Relief or Poor-law Board. How it should be organized in detail, it is not now for me to say, or whether in ordinary times its functions might not be performed in one of the local Secretariat Offices or otherwise without any special costly machinery. But our prolonged experience certainly shows more and more clearly, that, some such permanently organized department has certainly become necessary in all the Local Governments, whether other changes be made or not.

Mr. H. S. Cunningham, 25th September 1878.—1. The fact with which we have to deal is a failure of crops over considerable areas, occurring in some part of India, every few years.

2. From these failures two results always follow:—

(a) A paralysis of agricultural employment, the land, in many instances, not admitting of culture and the employers of labour being too poor to pay for it, and later on, a similar paralysis of urban employment, consequent on the pressure of high prices;—the general result being large numbers of urban and rural poor thrown out of work

(b) A rise in food prices.

These two causes combining throw considerable masses of the labouring classes and poorer landholders into a destitution so acute as to end speedily in loss of life, unless arrested.

(c) A third result sometimes happens, *viz.*, that there is not enough food in the country to keep the population alive. Thus in Mr. Elliott's instances there were deficiencies of 1½ millions worth and 3¼ millions worths, which had to be got into the country somehow or other, if the people were to be kept in existence. On the other hand, the North-Western Provinces have been largely exporting wheat throughout the late distress.

3. The Government therefore has two, and may have three things, to meet—

- (1) People out of work;
- (2) Excessive prices; and
- (3) Deficiency of food staple.

4. A hypothetical case is suggested, *viz.*, that the sum estimated to meet the distress occasioned by a crop-failure wholly transcends the resources of the province concerned, *i.e.* (as we all agree, I believe), its capacity to pay off the sum expended in relief before its next probable famine. Fortunately, we have not to answer this, because Mr. Elliott says that such a case has never happened. If it were necessary to answer it, I should be inclined to say that, as by admission such occasions are of very rare occurrence, the necessary funds ought to be supplied from the Imperial exchequer, and the national finances so adjusted as to meet such exceptional claims. A community in which, say a quarter of its number is starved to death, is, humanity apart, in such a state of dissolution as to involve great political danger. At any rate, the moral sense of mankind, public opinion at home, &c., would render it necessary to make some violent effort, perhaps almost amounting to a communistic experiment, to prevent such a catastrophe. It is very satisfactory that the facts allow us to dismiss this hypothesis; and of course the probability of a famine of this extreme character grows less and less every year.

5. Assuming, then, that the famines of India are such that the loss occasioned by them can be met out of the resources of the provinces concerned, the question seems to be, how to deal with each of the three results mentioned, so as (1) to save life, (2) avoid waste, (3) prevent demoralization and pauperization.

6. But first, how far can we curtail the area and intensity of the three results of crop failure? We can do, and indeed have done, much with the third, *viz.*, deficiency of food-staple. In no famine since Orissa has the actual absence of food and of the physical machinery for getting it on to the ground been a direct cause of mortality. This improved machinery of supply is still on a small scale; for instance, 13 distressed districts in Madras, with a population of 19½ millions,

imported by sea and rail half a million of tons of food from August 1876 to April 1877, at the rate of 2·9 per mile per month; but the United Kingdom imports 6½ millions of tons of bread stuffs, besides millions of tons of other food in an ordinary year. This facility of supply arises from having great wheat markets in East and West, and abundant means of transport and immense purchasing power. It would seem, therefore, that we ought to direct our efforts not only towards increasing locomotive facilities in every direction, but towards bringing within our reach, if possible, great food-producing areas. For example, the Punjab Doabs might be irrigated, colonized, and many millions of waste acres turned into food-producing land. So again, the possibility of water communication, *via* Ferozepore and the Sirhind Canal to the Jummoo, Ganges, and thence to the Mahanuddi, and so to the Madras system, on which Sir A. Cotton insists, should be ascertained; and if it be possible to carry corn from the Punjab by water to Orissa and Southern India, one more powerful safeguard against a food-deficiency will have been provided. So as to the various North-Western Provinces' irrigation projects, Sardar, Betwa, Ken, &c. The Government has special reasons for bringing every possible acre under cultivation, and every place within reach of a railway or canal. On the whole, we may say that we see our way to the means by which the actual food-deficiency must be met.

7. As to high prices, I see no reason to think that they will go down or cease to rise. India is now fairly in the whirl of European trade, and our railways will, as they develop, send up the prices of profitable exports. Unluckily for the Indian consumer, there have been several bad harvests in England, and this and the exchange have stimulated a great export of grain for the last few years. This gain of the producing class and its adjunct, the *harryali*, has been so far the loss of the consuming classes. This seems inevitable. All that we can aim at is by increased communications and more numerous markets, to prevent great inequalities and sudden rises, and to do whatever a government can do to enable the wage-rate to keep pace with the rise in prices. This it can do by—

(1.) Facilitating migration of labourers from parts where labour is plentiful and cheap, to those where it is scarce and dear, or to places at present uninhabited, *e.g.*, Central India and the unirrigated Doabs of the Punjab.

(2.) Encouraging new industries, manufactures, &c., perhaps inviting capital by its guarantee, as in the case of railways, till the industries get firmly established; every nation in the world but ourselves does this by protective duties, and, as America shows, with signal success. But Manchester is so vehement, and free trade so fashionable at the India Office, that any suggestion of the kind would only bring a hornet's nest about our ears. There is, however, much more to be said for our protective cotton duty than Indian statesmen have cared to say.

(3.) Doing everything to strengthen the morale of the labouring class, giving them increased ideas of comfort, &c., chances of rising, popularizing technical education, instead of the ridiculous parody of high-class European education, which we too often give, facilitating industrial enterprise, &c., &c.

8. On the whole, we cannot prevent prices going up; the object must be to see that the results of such prices are properly distributed and employed, and one class not enriched at the expense of another; and the Govern-

ment should not lose sight of the fact that the result of its good administration may be to make life harder at present to the labouring classes, and so justify exceptional relief to them. In the North-Western Provinces lately, for instance, the railway seems to have aggravated distress by sending up prices and carrying away food.

9. As to (1), people out of work, we must look to having large classes of labourers, from time to time, thrown out of employment and in danger of death, if not supplied with wages. In well-administered parts of India it is probably possible to forecast their numbers with an approach to exactitude. What often happens now is that they are left to themselves till they wander from their villages, crowd into towns, die about the roads, and otherwise attract the attention of the officials. Then, a survey is made, a relief-work is started, and then follows all the train of difficulties attendant on the endeavour to get masses of wretched, demoralized, half-starved creatures to work and be paid after some sort of method. The work is generally started too late to save life; numbers, from one cause or other, do not get within its scope; every department is strained to supply supervision, and the supervision is generally quite inadequate for anything like real control: the wage is a hopeless dilemma; if you give a low rate, the people desert and die, if you give a high one, you drain the labour market and the thing gets quite beyond control. On the other hand, the evils of small village-works and promiscuous relief are still less supportable.

10. In dealing with this matter, what are the forces at your command? You have—

- (1) An intense desire on the part of the people to stick to their homes and hold their little round of life, supporting their families and dependants as long as possible—generally, a power of cohesion in society, and an aptitude for mutual support;
- (2) A class of employers who have a considerable interest in the well-being of the labourers, and a traditional moral sense that they are responsible for it;
- (3) A good deal of kindly sentiment, which the religion of the country stimulates in the direction of charity to the poor;
- (4) Considerable desire for notoriety, &c., which makes people like to be Municipal Commissioners, unpaid Magistrates, &c., &c.

11. All these forces you neglect, some of them you impair or destroy, if you give your relief by way of large public works. On the contrary, they would all be utilized in a system of local relief. Suppose the administration to be such as Mr. Peile describes in Bombay, the District Officer with a real knowledge, or the means of getting it, of every part of his district—the country divided into circles, or whatever unit was most convenient, but so always as to have an European officer at its head—a well-considered plan of remunerative public works as local as possible—always ready—

tank restoration in Mysore, roads, tramways, embankments, reclamations, and if these did not exist, some provincial work as near as may be; put the governing body of the relief-circle in command of some funds, locally raised, in which it would feel a sense of ownership, and which it would therefore be an object to economize. Then, on the approach of distress, on information supplied by the village officials, and in concert with a committee of zemindars, notables, &c., the District Officer would resolve that so many people in a relief-circle were likely to be soon out of work, and employment at piece-work rates would be given on one of the works—people in quest of work would be forwarded from each village at once to this in village gangs or in whatever way was most convenient; the zemindars would feel it desirable not to have a work opened, and so would do their best to keep their people employed; the committee would feel it a disgrace to have excess deaths, &c.; no money would be wasted, because the work would be one that sooner or later ought to have been taken in hand. This would see the people through the earlier stages of distress.

12. Then, if distress deepened into a famine, the existing organization would admit of village relief to the bedridden, &c., poor-houses, hospitals, &c.; but all would be done methodically, with full knowledge of the subject, and without waste, confusion or hurry.

13. As to the extent of localization of expense, you must not have the arrear too large, or the motive to economy is lost; nor too small, because that involves all the nuisance, scandal and expense of English settlement law (e.g., a law-suit about a pauper, and his transmission, as I have often seen, from Kent to Connaught). But it would probably be possible to devise some plan which would give the administrators a real motive to help the people in the first instance, and to economize when public administration of charity had been declared by the District Officer to be necessary.

14. The various Land Rates Acts recently passed appear to suggest the sort of machinery which might deal systematically with local famine relief; take, for instance, V of 1878, the Punjab Act. It provides a fund of which famine relief is one object: a committee, partly non-official, to regulate the objects of its expenditure, &c. Might not this committee be expanded into something more—entrusted with the means and duty of knowing about and dealing with the earlier stages of distress, and of opening local relief-works subject to higher authority. Mr. Egerton tells me that, as a fact, the local committees have this year, in various instances, opened works with the express object of relieving pressure and so staving off general pauperism, and that satisfactory provision has thus been made for distress wherever it existed. I do not know whether the same view of their duties is taken by local committees in other provinces. But here seems at any rate an existing nucleus round which an efficient system of local relief might be formed.

Mr. G. H. M. Batten, 2nd October 1878.—I do not understand that the question before us is, what measures the Government should take to prevent famines, but what principles should be followed in the alleviation of distress caused by an actual failure of crops.

There can be no doubt that everything which increases the wealth of the country, which enlarges the supply either of food or of other products which can be exchanged for food, and which facilitates their distribution, must tend to prevent famine. In this view, I cannot deplore, with Mr. Cunningham, the development of the export trade from India of wheat. The wheat would not be sent unless something which was more wanted came in its place, and this trade must increase the wealth of the country.

This, however, does not seem to me to be the question proposed for discussion,—although of course in itself, a very important one,—but rather the financial management of an actual famine, when distress for want of food or the means of obtaining it, is impending, or has shown itself. It seems to me that in such a case, as in all others, where an evil has to be combated, the Government must do the best it can with the means at its disposal. This is a truism, but it leads to the examination of what is the best way of employing available means, and what are those means. It cannot be best to incur such an expenditure as will permanently cripple the resources of the State, so as to produce greater evils

than those which it is endeavouring to suppress. Hence, an unlimited expenditure with the object of saving all loss of life owing to want of food, is out of the question. On the other hand, it is impossible to name any particular sum of money which either in any specified locality or generally throughout the country may be spent on famine relief measures. As General Strachey observes, the problem must be solved *ambulando*. The first guiding principle must be rigid economy, by which I mean the most stringent endeavours to prevent waste. As a means to this end I have no doubt that the sense of individual responsibility must be awakened in those whose money is being expended, namely, the tax-payers, and that this can only be done by localising the financial responsibility by some such means as those suggested by General Strachey. The duty to be performed by the local community is the support of its pauper population. The business of the Government is to take care that this duty is performed, and to give such assistance as it can to aid the community in this duty of self-support. It is as yet to be proved that the task is an impossible one. It is possible to conceive an evil of such magnitude that all available means, used in the best way, may be incompetent to deal with it, but I believe such a case to be imaginary, and under any circumstances the rule must be followed to make the best fight possible.

Thus, although financial considerations must guide

every step that is taken practically to carry on the fight, I do not think that at the outset the financial question presents itself in the hard and bare form in which Mr. Elliott puts it in the paper circulated by him before our meeting the other evening. The State enters on a famine campaign as it would on a necessary war. In such a case, it neither contemplates an unlimited expenditure, nor does it lay down any fixed sum which it is prepared to spend. It is the business of the State to provide the funds, and, in a general way, to regulate the expenditure. Putting aside the suggestion of preventive measures, the object of the Famine Commission is to collect facts and to apply past experience, so as to put at the disposal of the administration as many practical rules as possible for regulating expenditure without

incurring waste. I will not attempt to anticipate here the results of the labours of the Commission to this end, nor did our discussion the other evening get so far as this.

I am aware that this note will not help much to solve the question proposed to us by Mr. Elliott, but I am afraid that, in the nature of things, no *a priori* answer can be found to that question, and that we must fall back on that simple rule of conduct which should guide every private individual, as well as every public administration, when an evil has to be met, *viz.*, that the facts bearing on it must be ascertained in the utmost detail possible, and advantage must be taken of all available experience in dealing with similar cases, so that blunders may be avoided and force economised.

Mr. B. W. Colvin, 8th October 1878.—It may be conceded on the one hand that it is quite impossible for the State to set limits to a famine, and to say, "So far you shall relieve, and no further." On the other, it is justly urged that the present mode of relieving famines is radically bad. It cannot be a good plan that cheques, which *must* be honoured, should be drawn upon the treasury for unlimited sums by persons who have no care nor thought for providing the means of meeting them. And yet this is not an unfair description of the course which we have hitherto been obliged to follow.

The remedy for this radical defect of the present system, it is generally agreed, is to enforce the principle of local responsibility, and to make people feel that if they wish to spend millions, they will have to find the means of raising them also.

I quite concur in this as a matter of principle, though it may be remarked, in passing, that the absence of local responsibility is a condition under which nearly all public money is spent in this country. But I do not see my way to any application of such a principle in practice, except in a very limited measure. I pass by what seem to me the minor difficulties, such as the want of suitable local machinery, and the time which it will take, judging from our previous attempts at introducing self-government, before the feeling of local responsibility can be made to work as an effective regulator of famine expenditure. I come at once to what is the insuperable difficulty, as I think, in the way of making provinces, districts, or towns pay for the cost of their own famines—which is that they cannot do it. The sums spent are too large to be recovered in this way, unless we greatly alter our manner of dealing with famines. A few instances will shew how great this difficulty is. To begin with one which was referred to in the discussion—that of Durbhunga. The yearly land-revenue of Durbhunga is 80,000*l.* The amount spent upon famine relief in it during 1874 was very little short of 800,000*l.* Grant that the expenditure in 1874 was excessive. Say that one-fifth of it would have been sufficient with proper management. Let us assume also that the entire revenue of Durbhunga from all sources is double its land-revenue, which is probably supposing the district to be richer than it really is. Even on this assumption, how many years would it take Durbhunga to repay 160,000*l.* with interest; and what hope would there be of the debt being paid off before the next famine occurred? That debt, upon the supposition made, would be exactly equal to a year's income, and a permanent addition of 4*½* per cent. to the entire taxation of the district would only just be enough to keep down the charge for interest.

Again, there is the case of Mysore. Last year's expenditure on relief in that province was about 600,000*l.* Its land-revenue is about 730,000*l.*, and its receipts from all sources are, I believe, about 1,100,000*l.* Therefore, if its total income were raised 5 per cent. by further taxation, it would take upwards of 15 years to repay with interest at 4*½* per cent. the 600,000*l.* which were spent on last year's famine. Even for this comparatively small debt, a very heavy addition to taxation would be necessary. Would it be possible to make it? And if it were, what margin would be left to meet further necessities of any kind during the next 15 years?

To take an instance on a larger scale. In the presidency of Madras something little short of 6 millions sterling was spent in relieving the distress of 1877. Its gross revenues do not much exceed 8 millions sterling. Is it likely that so large a debt, or that any considerable part of it, could ever be recovered?

It is true that there have been some famines of less severity than these, the cost of which could have been altogether repaid from local sources. The North-Western Provinces' Famine of 1869, and probably last year's famine in Bombay, are cases in point. But it is not a sufficient recommendation of a plan that it might be occasionally successful. A check which will only act sometimes and will fail to work just when it is most wanted is of no use. Yet the result of trusting to the principle of a purely local responsibility could scarcely be other than this. It would be sure to break down under the very strain which it was intended to bear.

The problem for solution then, as I understand it, may be stated thus:—

We cannot go on spending enormous sums of money without any check whatever upon extravagance, nor can we ensure economy by making every part of the country bear the cost of its own famines. This being so, how are we to regulate our famine expenditure so as to avoid bankruptcy on the one side and inhumanity on the other?

I must confess that I see no better solution of this difficulty than the Famine Insurance Fund of this year's Budget, supplemented by such imperfect attempts at enlisting local interest on the side of economy as are alone possible to us.

In the first place, such a fund ought to give us money enough. We have no very accurate knowledge of former famines, and the State spent nothing on those before 1861. There are, therefore, no data for conjecturing what their cost might have been. We know, however, that nearly 17 millions sterling have been expended in relieving famines during the last 10 years. At the same time, there are reasonable grounds for believing that the 10 years just past have been a time of somewhat exceptional calamity and (in Bengal at least) of excessive expenditure. It is not unreasonable then to anticipate that a sum of 15 millions sterling in every 10 years will be found sufficient for the future. If it is not, another half a million could be raised yearly without great difficulty, and the total increased to 20 millions in 10 years. With such a provision, I think that we are as well guarded as we can be from the danger of being forced into inhumanity by want of funds. It is not too much to say, perhaps, that this is the only way in which such a provision can be made. The truth is that a famine is like fire or shipwreck. Its effects are commonly so ruinous to its victims that, except on the principle of mutual insurance by general and continuous payments, its losses cannot be made good. In most cases, if we try to recover the cost of the calamity from the immediate sufferers only, we shall either fail to get the money, or else subject them to an affliction which is not less than the famine itself.

Assuming, then, as I believe we may, that we have sufficient funds to be safe from all risk of inhumanity, there remains the opposite danger, namely, that of extravagance, to be considered.

On this side it is to be remarked that the creation of such a fund is the first recognition of the fact that there are some bounds to the expenditure of the State on famines. No bounds had ever been set before, and an impression was being formed that the public benevolence was—and ought to be—inexhaustible in such cases.

Then extravagance in spending the money which is available might, perhaps, to some extent, be restrained by enforcing local responsibility. I think that it would be possible to say to Local Governments in such cases "You have received great benefits from the Famine Insurance Funds, and you must pay an extra premium as the price of those benefits." Such a plan would not be without effect in moderating expenditure. Governors

do not like imposing extra local taxation, nor district officers collecting it. The fear of it would make them pause before they incurred lavish expenditure; and they would no doubt in turn devise means for making those under them share their responsibility. It is only by a downward extension of this sort that it seems possible to make such a feeling in time reach to the people themselves. I see no impossibility in doing this ultimately. Indeed, the large official staff of Englishmen furnishes a better check in this than in most other countries upon local selfishness and apathy, which are the chief difficulties to be apprehended.

I doubt if this responsibility towards the Government of India can be carried down lower than to local Governments and Administrations for the present. There is no authority inferior to a Lieutenant-Governor or Chief Commissioner who can in any sense at all be held responsible in such a matter. The Government of India should make its claim upon the province, and the Provincial authorities must be left at liberty to distribute the burden as they thought best and fairest.

As to the amount of such extra contributions, it can rarely equal the entire sum expended in relieving the distress; but it might be made to vary in direct proportion to it so as to increase the inducement to economy. The ordinary contribution might be raised by 10, 50, or 100 per cent., as the expenditure on relief amounted to a tenth, or a half, or as much as the whole of the Provincial income. The term of years also during which the extraordinary contribution was payable might be made to depend upon similar considerations. But whatever the details of such a scheme might be, it is essential that a definite and uniform rule of some sort should be laid down. For there is no fixed relation between revenue and famine requirements, and no clearly defined limit in any part of the country to the capacity of bearing further taxation. If the amount leviable were left to be settled in each case as it arose, the settlement would be apt to degenerate into a scramble and a quarrel on every occasion between the Central and the Local Government, and to end in a very unequal and capricious distribution of the burden of local liability.

Besides this small measure of provincial responsibility, a good deal might be done towards controlling

and limiting expenditure by the constitution of a Central Famine Department, which I see that General Strachey also advocates. Some such central authority seems absolutely necessary. Every famine is an experiment at present, and it is not necessary to add to its cost by leaving it in the hands of novices. This central authority might act also in some measure as trustee for the insurance fund, holding the provinces to their liabilities, and restricting the use of the fund (as far as they can do so) to the purposes for which it has been created.

Lastly, there is the check upon excessive expenditure which is furnished by our existing tests of qualification for relief. I must leave it to others who have had practical experience in dealing with famines, which I have not, to say whether these can be added to or improved in any way. But I may, perhaps, venture to say that I think they might be more rigidly enforced in the case of the able-bodied mendicant class, who are always the first to come upon the charity of the State and the last to leave it. It is often the case that they will not work at all, and yet it has been thought inhuman to leave them to starve. I cannot help thinking that to maintain them in idleness is to lay an unfair burden upon the working community. It may be argued that it is the duty of the State to see that no man wants the means of earning his livelihood; but it can scarcely be held to be its duty to provide every one with a livelihood adapted to his taste. If private charity chooses to succour them, it can; but I do not think that they are entitled to any help from the public purse unless they work for it.

With these checks upon extravagance, imperfect as they no doubt are, and with the money which will be provided by the additional taxation of this year, we must be content, I think, for the present, to wait and to feel our way towards a better solution of our difficulties. It seems to me too early to lay down many principles for our future guidance. We are still too much in the dark. We have almost everything to learn; and experience in this, as in other matters, will have to be paid for. But we are in a position to meet all probable claims upon us whilst we are learning, and can afford to wait and trust to finding better ways as we go further and gain more light.

Mr. C. J. Iyall, 29th October 1878.—Taking the question where it is left by Mr. Batten, and understanding that it is admitted (1) that there are no practical means of laying down a rule which shall limit, at any given time, the amount of relief to be afforded, and that the resources of the country in dealing with famine cannot be so forecast as to make it possible to apply what is conceded to be the theoretically just principle, viz., that more should not be expended on relief of famine than the country can replace by economy during the years of prosperity; and (2) that the practical problem is how best to succeed in saving life and at the same time to prevent waste, I propose to examine how the last-named objects are likely to be served by enforcing the principle of local responsibility, and how far that principle can justly be enforced.

And first, what is "responsibility" in the sense in which it is spoken of in General Strachey's Note? Provincial responsibility means that the Government of a province must, by economy or extra taxation, find the money required for any purpose; and local responsibility means that the local authorities, within any given area, must find the money required from them in the best way they can. But on whom does this responsibility fall? On the agents of a Government supported by force, and able to exact what sums it deems needful from the people governed? It cannot, I imagine, be contended that a Magistrate, who receives a fixed salary which Government has no idea of taking away from him or reducing in proportion to the success of his endeavours to reduce expenditure, is responsible for relief expenditure in the same sense as an English parish, which must itself pay for the relief it gives. The Magistrate may incur official displeasure if he fails in carrying out the instructions of his superiors; but if he does what he is told, even though his action result in an excessive expenditure, he incurs no responsibility which can be enforced in the sense in which a shareholder of an unlimited Company can be made responsible for the administration of the enterprise. A public officer's responsibility is thus limited by his instructions; the sanction by which it is enforced is the risk of losing his post. But the responsibility of a Board of Guardians is

another matter. They have themselves to provide the means for meeting expenditure out of their own pockets and those of the community they represent. No such responsibility can be laid upon the officers of the Indian Government.

Then, upon whom can a responsibility resembling that of a Board of Guardians be imposed in this country? Only upon representatives of the people who will have to pay: that is, the urban and rural notables, the wealthiest and most influential men of town and country, who will themselves bear the largest share of any burden imposed, in consequence of their action in affording relief, on the community. The District Officer may, by an extension of sympathy, identify himself in interest with these; but he cannot, if he stops to reflect, feel that he is really obnoxious to the same penalties. His position is like that of the advocate of an accused person before the Court: he may be warmly interested on behalf of his client, and plead his cause with passion; but the sentence is not pronounced on him, and his emotion is but a passing one. He reflects that he has done his best, that he has performed his duty so far as was possible; and he dismisses the case from his mind, and continues the exercise of his profession as successfully as before.

Local responsibility, therefore, in the sense in which it controls the administration of poor-relief in England, must be imposed upon those who pay for that relief. The district officer may act as adviser, as guide, as controller; but he is not the person who bears the burden. You cannot say to him as to the guardian—Whatever you spend you must pay. His duty is merely to see, first, that no one dies, and, secondly, that no money is wasted. He himself is in no danger of dying of famine, nor is it his money that is spent. If, then, the real responsibility rests on the community, must you not give them the power to give or to refuse? Must you not commit to them the direction of the relief afforded? Otherwise it is not responsibility that you impose, but authority that you exercise. If this question be answered in the affirmative, then the further question arises, how much power to govern the administration of relief is to be conceded to the local representatives? In India,

where personal feelings of benevolence, though widely spread, have never reached the Western standard of public duty; where charity is limited by caste, by brotherhood, by tradition; it seems to me that there will be a very much stronger tendency than in Europe to endeavour to cast the burden of maintaining the poor of any locality upon another. Mr. Cunningham has dwelt upon the attachment of the Indian labouring and agricultural classes to their homes: I think he might, with equal justice, have dwelt upon their extreme mobility under pressure. No doubt, both cases are true. When pressure falls on Bundelkhand, there is a constant stream of emigration towards Málwa; when the southern portions of the Gangetic valley are smitten, crowds of wanderers roam towards the Terai. Emigration is a great feature of Indian famines; so also is the tendency, among some classes, to hold on to their place of abode till too weak to leave it. Neither is an absolutely universal characteristic, but both together cover the whole field. If this be so, then the inducements to a niggardly administration of relief in one locality will lead to an exodus of the poor to another; and a very slight extra pressure in one place, and extra bounty in another, will cause the transfer of large bodies of applicants for relief from the former to the latter.

How, then, are you to confine to each locality the relief which should justly fall upon it, and to restrain from wandering to one of greater liberality the poor upon whom severe tests are applied at any given centre? Nothing like a cordon of police is possible; nor is any check likely to be absolutely effective. Thus, a locality where it is thought that pasture will be found will be sought by people whose wealth is in their cattle, whether you endeavour to retain them in their homes or not; yet the grazing ground may be utterly unable to bear, as a relief centre and local area of responsibility, the charge of the multitude who flock to it. It seems to me that the only practical check on wandering of this kind, the only one which will be moderately effective, is to have everywhere the same standard of relief, so that a person shall not be able to find greater advantages, in food, wages, or facility of admission to relief, in one place than another. But, if you enforce everywhere the same standard, you take away discretion. You lay down a rule that so much, no less no more, must be given everywhere to each duly qualified applicant for relief; and if you do so, what becomes of local responsibility? It is but another name for the exercise of authority by Government, and of taxation of the community over which the community itself can have no control.

So we are brought round again to the present practice, the action of the magistrate under the instructions of Government; and local responsibility, when thus examined, appears merely to mean that the locality must pay for a charge over which it has no control. To give to one locality control over the administration of its funds would mean injustice to others on which the burden would be cast of the support of the poor whom by its rigorous enforcement of tests it drives away from itself. So defined, the "responsibility" extends only to paying, not to spending.

Is it, then, just that every local area should pay for its own poor? Those areas in India where there are most poor are not, like the great manufacturing towns of England, also the abodes of the wealthiest, but of the poorest only. Jhānsi, for instance, is a country of paupers, Sahāranpur (owing, be it observed, to canal irrigation introduced and maintained at the cost of Government), of comparative safety from want. At present, on the occurrence of a scarcity, the paupers, to some extent at least, flock into the wealthier tracts, where grain is to be had, and perhaps labour too. Thus the wealthier tracts, to some extent, minister to the necessities of the poorer. But if you enforce the responsibility of every locality for its own poor only, those which are poorest will lose the relief which the wealthier tracts now afford, and will be entirely crushed by the burden which you place upon them. It seems to me that, under these circumstances, it would be impossible to enforce local responsibility for payment generally.

But if not enforced generally, it becomes still more unjust: for, suppose that you impose on a rich district, say Sahāranpur, the burden of maintaining its own poor; and relieve a poor district, say Jhānsi, of the burden of feeding its paupers because it cannot bear it. This latter burden, then, you take upon the general revenues of the province which are collected from Sahāranpur as from all other districts. So Sahāranpur has to pay, not only for its own poor, but a share of the

provision for those of Jhānsi also. Local responsibility, in this sense, I do not see how you can justly enforce.

So also between provinces; some are rich, and now afford a refuge to the inhabitants of less favoured areas, which the latter would lose if relief of its own poor is to be cast as a burden upon the poorer province. The Central Provinces, for instance, are resorted to in times of pressure by crowds of emigrants from Bundelkhand: is the cost of maintaining these to be cast upon the Central Provinces? They are not subjects of that Administration: nor does their influx (provided that, as they do when better times come, they return to Bundelkhand) benefit its territories. But how would it be possible to separate off the cost of maintaining in the Central Provinces subjects of the North-Western Provinces, so as to cast it upon the latter government? Again, what is to be done with tracts like the Rajputana States? I have heard (I do not know whether it is true or not) that large numbers of people from the Northern States, Dholpur, Bharatpur, Jaypur, &c., flocked into Agra, and were received on the Government relief-works there during the recent scarcity in the North-Western Provinces. Certainly these, as subjects of another Government, should have been paid for by the States to which they belonged, but how, except at the cost of an enormous establishment, could any separation of foreign and British subjects have been enforced? And might it not be alleged that the time might come when Rajputana would afford a refuge to starving people from the North-Western Provinces, when the benefit would be required?

Looked at in this way, I cannot see the justice of the principle of local responsibility for payment, provided you accept the rule that Government must provide what relief is required to save the people from death. No doubt, however, though in my opinion essentially unjust, this principle would, to a certain extent, stimulate economy in relief. A local government, having before it the disagreeable task (even when you have not to pay yourself) of raising more money by taxation, would strive to have as little as possible to raise; a magistrate, if his district had sooner or later to repay the funds spent in it, would naturally wish to have as light a burden to impose upon his people as possible. A Municipal Commissioner, knowing that every person relieved must be paid for by himself among other tax-payers in the municipality, would be careful to see that every person relieved was really a pauper, and had no private means left unspent. The danger appears to me to be that these motives would lead to too great severity in enforcing tests, and that the effect of the personal interest involved would be rather baneful than otherwise.

On the other hand, the present system recognizes the solidarity of the whole empire; the funds spent are contributed by all who can pay, being raised by general taxation; you do not cast an excessive burden upon poor localities, and leave rich ones to maintain only the few paupers they possess. What is needed, as it seems to me, to make famine administration under existing conditions sound is merely that you should agree as to the principles upon which relief should be afforded; what classes of persons should be relieved, and how; and what tests should be applied. Once you have your principles settled, and all precautions against waste, while due facilities are given for saving life, properly established, then, it seems to me, the funds for working the famine campaign should, as in the case of war, be contributed by every one in the country who can pay.

P.S.—The above was written before I had the opportunity of seeing Mr. B. W. Colvin's admirable note; I notice that, while conceding the theoretical justice of the principle of local responsibility, he does not think that it can be carried down lower in its application than the Province. Unless the ability of the risk in any place to pay is in some way connected with the inability of the poor in the same place to maintain themselves (as in an English manufacturing centre), I am unable to admit the justice of making a special locality pay for its poor. India is, broadly speaking, an agricultural country, and the wealth or poverty of a tract depend on its agricultural conditions, and are (again broadly speaking) common characteristics of all individuals in the tract. For this reason, it seems to me, it would be unjust and impossible to cast upon the inhabitants of a tract visited with famine the cost of relieving that famine, because all would be involved in a common calamity, and the burden would be crushing. On the other hand, it is rather good fortune (or, as in the case of irrigation works, the liberality of Government) than virtue which has enabled another

tract to escape dearth; not only does it escape itself, but it reaps enormously increased profits from the produce which it sends into the afflicted district. Such a tract, it seems to me, should, on every ground of justice, contribute to the relief of the needy area, and this can be effected only by general taxation proportioned to taxable wealth.

Mr. C. Grant, 28th October 1878.—Mr. Elliott began by enquiring what course, supposing the estimated cost of a famine to exceed "such a sum as could be recovered by extra taxation in the province, and could be paid off, principal and interest, before the next famine arises," should be taken by the Head of the Government. He could have before him the dilemma of either crushing his province by an intolerable burden of taxation, or of inhumanly refusing relief, beyond a certain fixed limit, to people dying of starvation.

In consequence of the course taken by the discussion, the question, as it now presents itself for consideration, has somewhat changed its aspect, though essentially it remains the same. But it may be worth observing, before going further, that, in the present state of our knowledge, it could scarcely come before any of the local governments in the rigid form into which it has been hypothetically thrown. Even supposing it were possible to forecast with sufficient closeness the intervals between existing and future famines, there would still remain the difficulty that provincial revenues do not at present accurately represent the fruits of local taxation; and conversely, that provincial expenditure does not always correspond with the charges justly debitable to the particular unit of the empire. For example, on the one hand all the customs and a large proportion of the salt revenue are collected by, and accredited to, the maritime provinces; whilst, on the other hand, the provincial expenditure of some divisions of India is increased by imperial exigencies. The present mode of balancing accounts between the empire and its constituent parts probably answers all immediately practical purposes, but it would scarcely be accepted as a sufficiently accurate and complete foundation for a system of absolute individual responsibilities. And even if the imperial accounts were so accurately adjusted as to admit of something approaching to exact definition of provincial resources and liabilities, it might still be a question, in computing the means of meeting famines, whether it would not be better to consider India as a whole, allowing for some give and take between its component provinces in times of difficulty, than to set up a separate scheme for each unit. Whatever mode of calculation were adopted, it would be equally necessary to establish some ratio between expenditure and resources, as well locally for each province as generally for the whole empire, but the enlargement of the field of observation would make it comparatively easy to forecast calls upon the public funds.

But the issue really involved in Mr. Elliott's proposition is something much more important than a mere question of calculation. However public revenues are computed and allotted, there should be no practical difficulty in assigning roughly a limit beyond which further strain on them becomes either impossible or at least so dangerous as to be reasonably inadmissible. Are, then, people to be left to die of hunger when this point has been reached?

Many of the sharers in the discussion seem to have thought that no such dangerous crisis need be anticipated, because, if proper restrictions are placed on the administration of relief, experience shows that it may be kept perfectly well in hand. But then, as Mr. Elliott points out from his Mysore experiences, we must be prepared "to accept the responsibility of a mortality which will be greater or less according to the severity of the famine, . . . and to acknowledge that the tests, which keep off undeserving applicants, will also keep off some who are in real distress." That is to say, the imposition of rigid tests is inconsistent with the principle, which has been so much insisted upon of late years, that human life in India shall be insured against starvation at all hazards. No doubt this doctrine has been mainly pressed upon Indian administrators by the weight of irresponsible public opinion in England; but it could not have failed to make itself independently felt, and indeed seems to have left a deep impression on those recently engaged in the work of relief.

The question then seems to resolve itself into this—

Provinces are but administrative divisions, made for the convenience of our rule; and if the considerations above stated are good reasons against enforcing local responsibility in less areas, I cannot see how that principle becomes just when applied to the larger, but not necessarily more homogeneous or more self-dependent, area which we call a province.

what is the best compromise which can be attained between the conflicting principles, (1) that tests shall be so relaxed as to admit of life being saved without regard to cost, and (2) that relief shall be so restricted as to confine expenditure within due financial bounds? It seems certain that this latter object may be attained without apparent injustice, by requiring sufferers to seek relief, instead of making relief seek them. Many are so apathetic—some are so proud—that they put up with hunger, and cling to their empty homes, till it is too late to escape with life. But probably no one would now advocate exclusive adherence to what may be called the passive system of relief. If indifference and want of enterprise were the exception, as among more active nations, instead of being the conditions with which we have habitually to deal, no allowance need be made for them in relief administration. But I believe all recent famine experience has shown that relief must be brought, more or less completely, to the very doors of the distressed, as the only means of preventing loss of life on a large scale. If this be once admitted, then the danger of unmanageable and immoderate expenditure is immensely enhanced; and no general rule or broad principle can be laid down for keeping it within bounds. Everything must depend on the establishment and observance of such precautions as the trained experience of the best famine officials, aided by local knowledge, can suggest. But probably even if the difficult confession be openly made that absolute immunity from death by starvation is not attainable in this country without financial ruin, and relieving officers are allowed to remember that the funds which they administer are not inexhaustible, their natural instincts of humanity may be trusted to prevent any great amount of suffering. It should be sufficient for the State to bring its responsible officials face to face with starvation, and let their human impulses work—there can surely be no need for pushing them on beyond the dictates of feeling, sharpened by actual contact with the misery of fellow creatures.

It has been suggested as the best means of avoiding extravagance, "that the principle of local responsibility should be relied on to enlist the people themselves on the side of economy," the *modus operandi* being, as I understand, to take advantage of existing representative bodies in municipal towns; and for rural districts either to utilise district institutions, or to create special committees. No doubt any measure tending to enlist, on behalf of our administration, native knowledge and native sympathies would strengthen our hands, not only in a direct manner, but indirectly also by helping to carry with us public opinion. But I venture to think that no one, who has had much experience of the working of local committees, at any rate in Northern and Central India, would expect from them very much aid in solving the more difficult problems of relief administration. Human life being prized less in the East, and money having a greater value than in European countries, native committees, left to themselves, and administering their own funds, would probably lean more to the side of economy than we should think at all justifiable. In practice, moreover, it would be found very difficult to localise the burden of relief; as, when the crops fail, most towns have to provide for an influx of agricultural labourers, and, in the same way, the less distressed districts are over-run by swarms of starving wanderers, largely proceeding from native states, local rates could not fairly be charged with the support of distress thus unconnected with the locality; and local native committees could not certainly be trusted to dispose of funds raised without pressure on their own resources. As a means of public education—as a lever for arousing local sympathies—as an aid in meeting caste prejudices—and as a support before the tribunal of public opinion—in all these ways the co-operation of native committees would be most valuable, both to the people of India and to ourselves; but we cannot yet expect to found on them the machinery of a scientific poor-law administration.

Mr. A. C. Lyall, 1st December 1878.—I find I have unluckily mislaid your original note of the subjects for discussion at our Simla symposium; and my head has been so full of other things that I cannot readily recall the precise points which we specially took up on the famine question, and, as I have always told you, my knowledge of famine facts and actual experience is very slight.

I think, however, that one of the debates in which I had some share was as to the extent and degree of the State's responsibility for loss of life by famine—whether there is any limit to the financial sacrifices which a State is bound to make to keep people from starving. My notion was that, for the State to pour immense supplies into a province whenever the officials calculated that there would be a great deficiency of the food raised and consumed in the country, would demoralize the poorer classes, by causing a great laxation of the incentives to individual exertion for self-preservation, and that it would inevitably prove a wasteful and extravagant system, unfair to the general body of tax-payers.

In regard to the first point. You told me once that, as a matter of fact, wholesale State relief is not known, in periods of famine, to leave an after-effect of demoralization; and here I cannot argue as to facts, for I have not studied special histories of famine, but I know that the tendency of State relief on a great and systematic scale has always been towards the effect I mention; and that wherever the State takes charge of the poor of a country, it has to take very rigid measures indeed to protect itself and society. (Witness the reports on the old poor-law, and the regulations of the new poor-law, in England). I say, therefore, that the proposition that the State is bound to keep people from starving is subject to the conditions that it can find a way of doing so without lowering the general *morale* of the classes it relieves, and without unfairly burdening the contributory classes. And I doubt whether any system which merely brings in on an emergency a body of officials with long purses, immense command of resources, and the systematic machinery of famine administration, will ever succeed in founding a permanently satisfactory method of dealing with famines. One Government will do too much, another too little. One will proclaim this set of principles, another will proclaim that set, we shall be always swaying to and fro. As we see in every department of Indian administration—in the question of land revenue and tenures for example—there is a great absence of stability and fixed tradition about our Government. The men come and go, and the measures and ideas are continually changing. Any system you wish to last must be nailed to something stronger than the official desk. So I think that wholesale State relief is likely never to eventuate in a sound and solid system, but that it will do a good deal of harm to the people whom it attempts to protect. And I consider that your efforts should be directed towards localizing and naturalizing some arrangements for dealing with the famine that shall be as much as possible independent of the *Deus ex machina*, of the earthly Providence, whose means are supposed to be inexhaustible and power infinite. You know the feelings which prompt very advanced speculators on theological topics to declare that even the conception of an Almighty Deity is in some ways demoralizing.

But you will say that no local system is adequate to meet these great social crises; that self-help must fail; and that the State alone is strong enough to save a perishing multitude. Here comes in perhaps the question which I raised at your dinner. Granting that the State can do what is wanted, how far is it bound to use its power for the purpose of saving life? What I then suggested was that, if you push too far this obligation, you will be landed in Socialism, *i.e.* in that modern form of Socialism which makes the State responsible for the organization and direction of society, for finding work and food for the masses. I myself am much opposed to all theories of this kind; and I dread any social or administrative changes in India which tend to increase the already immense power, and especially the responsibilities, of the State. I think it a very dangerous political education to give to these vast masses of poor Indians, who form our subjects here, that they must look to the State in all great calamities; and I greatly doubt the capabilities

of English officials to guide such a powerful machine as the Indian Government is fast becoming. For these reasons, whatever be your views as to the State responsibility for loss of life in famine, I would keep them well in the background, and I would never proclaim them as the basis for action.

One never dares say openly anything that appears to men holding human life cheap; but to my mind there are many principles which the State, or at any rate a free nation, ought to and does place higher than the question of saving everybody alive. Man does not live by bread alone; and I would myself much sooner risk some loss of life by starvation. I would rather let the struggle for existence become occasionally sharper and more fatal than it is, than I would organize in India any system which, however it began, might very soon extend to an unmanageable and unlimited scheme for State relief. If a famine came once or twice in a century, the State might take it in hand safely, but on the assumption, which I understand to be admitted, that famines are likely to recur at short periods, I hold that the intervention and responsibilities of the State must be very cautiously permitted and acknowledged. That is, I would direct all my attention toward so shaping the preventive measures and rules of procedure in cases of famine as to keep out of sight the idea that the State is standing close above the masses, ready to step in and quench the rising famine as completely as a large fire-engine turned on with unlimited water will put out a fire. I believe that the proposition that the State is bound, at any mere financial sacrifice, to save human life in famines, cannot be laid down without seriously damaging principles and social structures far more important to a community than the preservation of life. And I consider that in India there is real political danger in the State undertaking too much, while I doubt the State being ever able to perform properly the direct administration of continual famine relief. The first rule of relief should be that a man is not to be helped out of other people's pockets until we have ascertained by some rigid process of testing that he has exhausted all the means in his power of helping himself. I doubt whether this test will ever be properly applied, except under some local system managed by the people of the country, who know accurately the real needs and resources of each district.

You must excuse a hasty sketch of my ideas. I have hitherto written nothing, because I felt myself practically unfamiliar with the whole subject.

A. C. LYALL.

P.S.—About the Rajputana famines. There was a very bad one in 1868 as you know. It took off a fourth of the population and destroyed immense numbers of cattle. But its effects in sharpening the wits and foresight of the people was remarked to me by many natives when another famine was thought to be on us in 1877. All the Thákurs, *i.e.*, the great Rájput talukdars, had laid up much larger reserves of grain; and indeed all the people had done this according to their capacities; while I believe a good deal more forage had begun to be raised for the cattle. The Thákurs of Marwar made preparations for holding their cultivators and others together as if for standing a siege; the petty free-holders, and the Játs, and Gujars dispersed rapidly in search of pastures into Malwa. The officials as usual were busy in buying up all the corn for their own profit, nominally for State distribution, and in peculating the State charities.

It would in 1877-78 have been a grass famine even more than a grain famine. In the old grain famines many people in Rájputana took to eating beef, and became thenceforward numbered among the non-Hindu tribes of the jungles. The chiefs do what they can, but they have only corrupt officials as their agency; the real strength of the country lies in the Thákurs and the clan system. He who, being too anxious to establish a regular and orderly uniform administration, breaks down the present power of the Thákurs in the Rájput States (although the power is much abused) will do the States irreparable damage. What such a State will be in time of famine is at this moment illustrated by Kashmir. The Chief is powerless; his officials plunder him and his people, and there is none to gainsay them except a Political Agent.

Sir Richard Temple desired me to say—

That he considers it to be the duty of a Provincial Government to arm itself against future famines by having a complete scheme of Public Works prepared, and also an organization for famine relief carefully matured and ready to be put into action the moment an emergency arises. This has already been done for Bombay.

He considers canals and railways the best works to carry out as safeguards from famine. By carrying out these in famine times, these inevitable natural calamities are converted into means for increasing the prosperity of the country.

He thinks that the famine of 1876-77 in Bombay was successfully dealt with on these principles, and that the Government did not lose its money, and also did not lose its peoples' lives.

At the same time he notes two things:—

(1) That no previous preparation can be of any use if the head of the administration takes a different view, and will *not* carry it out vigorously.

(2.) All famines produce new phenomena, and mistakes will generally be made in dealing with what is novel.

He thinks that no famine can be successfully dealt with, unless *village relief* is most elaborately and painfully carried out. This is both difficult and expensive, but nevertheless it is quite indispensable—the *sine quâ non* of all relief operations.

Again, the people will not be collected on large relief works as long as any hope of a rainfall continues. If the rain fails in June, July, and August, starvation will appear, but the people will hang about their villages until October passes, and still there is no rain. So that November arrives before the large works can be opened.

He is in favour of vigorous legislation (1) to empower the magistrates to coerce the starving people for their good, and to make them obey orders; and (2) to enable

the municipalities and towns to tax themselves to raise funds for relief, or to enable the Government to do it when they fail. Legislation may also deal with immigrants from native states.

He approves of the division of labour thus: the Public Works Department officers to manage all relief-works as far as possible and the Civil officers to manage village inspection and relief, the classifying of applicants and the forwarding of them to (1) relief-works, (2) hospitals, (3) poor-houses, according to their condition.

With regard to taxation for famines, he is strongly in favour of taxation by Presidencies. He thinks that to tax smaller areas, e.g. a famine area or a district where a famine occurs, would be logically unjustifiable. But a tax on a Presidency is wholesome in checking the tendency of local public opinion to advocate extravagant views as to expenditure on relief.

He is totally averse from remissions of the land revenue. He would admit *suspensions*. But in the first place he holds that the revenue-payers are not the class most afflicted by famine, who are rather the day labourers and artisans, and secondly, Government cannot afford both to give up its revenue and pay for relief. And as the assessments are made on the principle that the revenue is a moderate rent-charge on an average crop, it is unreasonable to ask Government to sacrifice its revenue in a bad year, when it claims nothing extra from the large profits of a good one.

Besides canals and railways, he especially insists on the preservation of forests and reboisement. Firstly, because he is convinced that even if forests do not promote condensation of rain, they retain and distribute moisture in a beneficial way, and secondly, because if the country were re-clothed with woods, a supply of wood for fuel would be available, and the manure now used for fuel could be returned to the land, and the deterioration of soil checked.

Mr. J. B. Peile, 17th September 1878—I will first say what I think the practical course as to the treatment of the subject of famines and then say something about the general advancement of the people of India.

I think it is advisable to begin by defining the area we have to deal with, and thus simplifying our task and bringing it within limits.

I do not know how far this can be done elsewhere. It can be done satisfactorily in Bombay.

This presidency is a long strip of coast from Sind to Canara, with a second and third line of districts inland above the ghâts. The coast rainfall increases continuously from 8 inches average fall at Karachi to 73 at Bombay, and 152 in Canara. Sind has so little rain that it cannot depend on the monsoon for cultivation. But it has the Indus, fed by Himalayan snows and overflowing yearly. This inundation practically puts Sind out of danger of famine, and we may dismiss it. Next come Kutch and Kattywar, liable to famine, but owned by rich Native Chiefs, and very accessible by sea. With vigorous political officers they should always tide easily over a year of famine, using the Chiefs' cash balances for relief works. Then we come to Guzerat, prosperous and not in the past much punished by famine. It needs, however, some attention. Then comes the Concan Coast, practically safe from famine—rainfall heavy. So also a strip of country along the top of the ghâts. But inland from the ghâts comes a dry belt where the rainfall is small and uncertain—the famine area of 1876-77, and of many a previous scarcity. This is the tract we have specially to protect—the East Deccan. I believe that beyond our border still east, the rainfall is heavier and more regular.

I would prepare for future famines by treating this tract as the Prussians treat a country on which they are going to conduct a campaign. We have already in our pigeon-holes a complete scheme of irrigation projects for this tract, and a special map showing them; also proposals for the extra railways needed. There must be added to these careful instructions for famine-officers, for relief works, poorhouses and hospitals: the respective duties of Public Works Department and Civil officers being defined: rates of wages: scale of diet: amount of work to be exacted, and so on. When a famine comes, put on every competent *English* officer available, and let them work strictly by their orders. The Civil officers will traverse the villages, register applicants send the able-bodied to relief-works, and the feeble to hospitals. The Public Works Department

officers will organize the people on works, see them paid, exact the prescribed tasks, and have each his hospital attached to the work for the sick. I believe that rigid organization, intelligently and actively worked, on the principle of supporting *but not attracting* the starving people, will give the best result at least cost. I would legislate to give powers to deal with people unable to support themselves as seems necessary, and perhaps to enable Government to tax towns for their own starving people: possibly even to control private charity, but this last I doubt.

This may seem somewhat hard, but I fear it is necessary to be hard, to save the public purse and to defeat fraud and imposition. The great thing is to begin in time. And I think the Public Works Department should take the people on large works as soon as organization is necessary. Our Civil officers can be most efficient in visiting villages, selecting subjects for the relief-work, or the hospital, and so on.

In Bombay we have a system which gives us a great knowledge of the people and what is going on among them, as there is an intelligent official who can write a clear report in every village, who also keeps a complete set of registers and statistical returns and is in constant communication with the Mamlutdar; while the assistant collectors are in their talukas eight months of the year, always among the people.

No doubt the difficulty of thus preparing for a campaign may be much greater elsewhere, e.g., in Madras. And you may not agree about taking the people from their homes. It is contrary to all their instincts, and in many ways an evil, but I believe it is a less evil than the hopeless and costly task of relieving them solely in their villages.

And now to pass from the occasional short and sharp campaign of a famine to the larger question of the permanent condition of the people—how they may accumulate resources, so as to be able to bear one year of famine without falling on the Government funds.

We have to effect this on an area with the lowest and most capricious rainfall in the Presidency, a wretchedly poor soil, and a population used to a very low standard of life, and enslaved to its money-lenders. We have presumed too much on the capacity of this poor class to raise their own status by intelligent exertion. We have put them into an independent position (their lands being made heritable and transferable property on regular payment of a low fixed rent charge) in the hope that they would profit by the strict limitation of the

Government rights Back woodsmen would have profited. But after a long trial, some vicissitudes, and at least one fine chance of prosperity, we find these peasants deeper in debt than ever, and mobbing their village capitalists. They were not, it seems, capable of *safely* using the rights given them, because they carried responsibilities, especially that of foresight, to make a good season cover a bad one, and to keep out of the Sahukar's hands and clear of the Civil Court's decrees. This is easily tested by comparing Native States. There the tenant pays at least double what the Khalsa tenant pays in ordinary years, and yet there is no pressure, discontent, or rioting. Why? Because, (1) the rent varies with the year, (2) the native chief recognizes in his tenant a valuable chattel, and will not let him be pressed by the Sahukar or the Civil Court.

To some extent, therefore, I think we have to retrace our steps, and revert to paternal or sympathetic treatment of a class so low in the scale of intelligence and standard of life as the Deccan ryot.

I think it is a good idea to make each village accountant a notary, require all loans and mortgages to or by cultivators to be executed before him, and make him keep each tenant's debt account, and hold him responsible that it is kept fairly. I think the Bombay village accountants can do this. I hope the Civil Judges everywhere, without special legislation, will recognize the duty of going into claims of Sahukars against ryots, unravelling them, and giving equitable decrees, to be mercifully carried out.

As to *taccavi*, I don't think more can be done than has been done here, perhaps something may, to bring the idea closer to the tenant's mind. But the rules are already wonderfully attractive. They would tempt anybody but a Deccan ryot.

If we had but a substantial middle class. A Government has a hard time which is landlord as well as ~~ryot~~ ^{farmer}.

There is just the same difficulty about public works and agricultural improvements. No doubt we must go on with them. But how simple it would all be with a race of substantial yeomen, competing for the land, and putting all their capital and brains into making the best of it.

As to the land revenue, it would be against the whole idea of the Bombay settlement either to remit largely or to have a fluctuating assessment. Our officers say, if we take a mere quit-rent on a good or even fair crop, how can we be asked to give up our assessment on a bad one. The system assumes that a tenant will be provident enough to make a good year cover a bad one; but he is not, and so he goes to the Sahukar and is ruined. We try to get intelligence and forethought from an ignorant barbarian and fail. The Indian ryot prefers to have his share of what there is, be it small or large. If we hold to our system, I hope at least we shall avoid sudden great enhancements in future on such a fallacious basis as a rise in prices.

I should like to see less food grain and more exportable produce. And certainly, as you say, more manufactures. I don't know what we are to do with our increasing millions, if we don't establish industries.

Education, of course will help, in a century or two. But I fear we have made mistakes there also. My term of service as Director was one of disappointment to me. Somehow the higher education was alienated from the nation, and those who obtain it seem singularly inept to return its benefits to their countrymen. Again, the want of a middle-class in the Mofussil. Bombay city is not in India.

I am in favour of an insolvency law. But as to preventing the alienation of land, I am less certain. It would involve many evils—*e.g.*, bolstering up a bad impecunious cultivator, who would be better as a day labourer.

Reduction of expenditure, certainly. It must be possible to say, we will give so much to each department, and this shall not be exceeded. As to taxation, I share the opinion of many here, who regret the abolition of the income tax, which with a high minimum taxable income would touch those who pay far less than they should for the peace and order they thrive on, and which can be raised to meet an emergency without extra cost for collection. Of course it may be said that it is a dangerous weapon in the hands of a rash financier.

You will, I am sure, be interested when you study the system in Bombay by which the officials know the people, as it seems to me satisfactory. And the organization for famine work has also been carried on to a very fair completeness. But I will not say more; both from want of space and because I do not wish to appear as a partizan of Bombay arrangements, when I must confess myself still inexperienced in those of other provinces.

The above remarks are sadly crude and meagre. I am sensible that they are hardly full enough to express my meaning, but I shall hope to amplify them in conversation, and I will be careful to have all the papers needful to set forth our system completely for comparison with others.

I think that the answers to the questions will be most useful for this purpose.

Yesterday I had a long consultation with the Governor on various famine topics I had noted. He showed me your letter to him, and at the close of our discussion asked me to send to you a brief statement of his views, which I enclose on a separate paper. He says he will write to you shortly, and that he proposes to give us a minute on the principal points I consulted him upon, which he will prepare in October, when he gets a little leisure at Mahableshwar. You will find much of his conclusions in his Bengal, Madras, and Bombay Famine Minutes.

VI.—MEMORANDUM ON PRIVATE RELIEF IN THE MADRAS FAMINE.

By Mr. W. Digby, C.I.E., the Honorary Secretary, Indian Famine Relief Fund, 1878-1879.

It seems to me that there are three aspects in which this question should be looked at if all the advantages possible are to be obtained from the experience of the (nearly) two years during which the Committees of the Famine Fund of 1877-78 have been working. The three points I should like to discuss, or have discussed at length, are: I.—*The circumstances under which Private Charity in 1877 came to take a part in Relief operations unexampled (in extent) in previous Famines;* II.—*The mode adopted of Distribution of Funds, and* III.—*Can Private Charity (in view of the Viceroy's Despatch of December 21, 1877) play any part in Future Famines?*

The first point to be noticed is,

I.—THE CIRCUMSTANCES UNDER WHICH PRIVATE CHARITY IN 1877 CAME TO TAKE A PART IN RELIEF OPERATIONS.

When the famine first declared itself, private charity was prompt to take a part in helping to relieve distress. The efforts then made, which efforts were fitful and unsatisfactory in their working, were, however, checked by Government, and almost entirely ceased. I may now take up the narrative as it relates to the period when it was feared that the South-West Monsoon of 1877 would prove a failure. The narrative is as follows:—

"A general meeting of the Directors of the Monegar Choultry at Madras, sitting in a small dark room in which the meetings are generally held, had in the month of July 1877, concluded its business and was about to break up, when the Chairman, Deputy Surgeon-General vanSomeren, was asked, 'Is there not a Minute from one of the Directors to be read?'

"'Oh! yes,' replied Dr. vanSomeren, 'Mr. Krishnamma Charriar has sent a Minute about the high-caste poor, who, he says, are suffering greatly from high prices, and who will die rather than go into relief camps, or receive cooked food, and suggesting that the Choultry should undertake the support of such.'

"'We can do nothing for them,' remarked a Director.

"'Our means are already straitened. We shall need helping ourselves.'

"'Perhaps we had better forward the Minute to Government, and leave the authorities to deal with it,' said the Chairman.

"'This was agreed to, and the subject disposed of, so far as the Choultry was concerned.

"By the time that the Minute reached the Governor in Council, distress had intensified, the south-west monsoon persistently holding off. His Grace and the members of Government had been brought face to face with much suffering consequent upon high prices; the suggestion from the Choultry, therefore, received prompt attention. The authorities saw plainly that they could not deal with lower middle class distress; it was more than they could do to grapple with absolute destitution. It was, therefore, resolved to revive the plan proposed in the previous February by Mr. Burrows, President of the Municipal Commission, and relieve the distressed through committees formed of the Commissioners. Also, as a part of this scheme, it was determined to change the policy hitherto adopted, and instead of deprecating public subscriptions, to ask for them, for every rupee contributed Government giving another. A grievous mistake was made at the outset in the mode adopted to appeal to the public for aid. Municipalities are new institutions in India, mainly noteworthy for harassing the people in the persons of the tax col-

lector and the sanitary inspector. The yoke is borne uneasily, and a scheme floated by such an agency is doomed to grudging support. A meeting of the Commissioners was held to determine upon the steps to be taken to meet the views of Government, which had been communicated. Conversation was somewhat desultory, but some definite arrangements were made (1) a central committee was formed, which representative men were to be asked to join, (2) it was agreed that divisional committees should be appointed at a meeting to be held on the Saturday following, July 28; (3) subscriptions were to be invited.

"On July 28, a meeting largely attended was held. It was then stated that it was intended to confine the proposed relief to the actual residents, and not to 'wanderers' daily arriving in the town; to those who were unable to avail themselves of the relief provided through the present system, and those who from self-respect or other causes, were prevented from going to the camps; as well as providing for other poor who, if not afforded immediate relief, would die of starvation. Certain rules had been framed, and related principally to matters of routine. One anna money-payment would be made to every adult, and six pies to every child, to be given daily by one of the members of the committee. This was subsequently altered to weekly payments—eight annas to an adult, four to a child.

"After eight committees had been appointed, for the several divisions of the town, aggregating nearly two hundred gentlemen, it was decided that an appeal for subscriptions should be made in the city.

"It was subsequently ascertained privately that, if solicited, his Grace the Governor would not be averse to presiding over a public meeting, whence an appeal might be made to England. The following resolution was therefore prepared (by Mr. Digby) for submission to a meeting of the central committee, which was called for Tuesday evening, July 30:—

"That the Central Committee of town relief for Madras arrange for a public meeting being held at an early date in the Banqueting Hall, over which his Grace the Governor be asked to preside. That at this meeting resolutions be submitted which shall show the extent of distress throughout the Presidency, and that the aid of the communities of Calcutta, and other Indian cities where no abnormal distress is being experienced, be sought. Also that the Lord Mayor of London and the English Chambers of Commerce be communicated with, and that the India Office be asked to place all available communications regarding the famine at the service of the English press. That as the Local Government undertake to keep the people alive, as far as possible, it be suggested, that the funds raised in England and elsewhere be employed in supplementing Government aid, and in providing implements for agriculture and seed-corn for sowing, during the approaching north-east monsoon season.

"A great many obstacles to the calling of the meeting were raised, but after much difficulty they were overcome, and the resolution, with some slight amendment, was passed.

"Three days later a meeting, which has now become a prominent feature in Southern Indian history, from the consequences which ensued from it, was held in

¹ For seven months these committees laboured most zealously in the various divisions, personally distributing week by week the dole provided. The work was arduous, but it was most cheerfully done.

" the Banqueting Hall, Madras, under the Presidency of his Grace the Governor, and an appeal was telegraphed to the Lord Mayor of London and the chief municipal functionaries through *The Times* newspaper.

" The following resolutions were unanimously adopted;—

" I. That the increasing severity of the distress arising from the famine necessitates an appeal to public charity.

" II. That with the view of obtaining the aid referred to in the first resolution, the Lord Mayors of London, York, and Dublin, the Mayors of Bristol, Birmingham, Liverpool, and Manchester, the Lord Provosts of Edinburgh, Glasgow, and the Communities of Calcutta and other cities and stations of India, and the editor of *The Times*, London, be at once informed by telegraph, and more fully by letter, of the urgent necessity which exists for assistance, and be solicited to adopt such measures as they may think most suitable for making the condition of the Presidency known to the public.

" III. That the existing Town Relief Committee with its Divisional Committees be requested to continue in office, and that a Central Committee be formed to undertake the general management of the Famine Relief Fund.

" A committee of about fifty gentlemen was appointed, and a meeting was held on August 6th, in the Magistrate's Court at Egmore. Sir William Robinson was elected chairman, and Mr. Digby honorary secretary. An Executive Committee, consisting of twelve European and Native gentlemen, was appointed, and the form of appeal, which should be addressed to England, was decided upon.

" On July 28th, the Governor had written; 'I can see no possible reason why private charity should not be called in aid of the dire distress at the present time, in clothing the naked and housing the homeless. There is open, alas, an ample field for the most liberal efforts of charity in England and here.'

" In India the response which was made to the appeal for subscriptions was very pleasing. The first notable sum received came with such promptitude that good heart was at once put in all interested in the movement. Acting on a telegraphic account of the meeting in Madras, which was published in *The Times of India*, the Government of Baroda telegraphed a donation of Rs 10,000. The Prime Minister of Baroda, Sir Madava Row, K C S I., was a native of Madras, and had not forgotten, in his elevation, the scene of his early struggles. It was hoped that the example of Baroda would be generally followed in India, and that in the great cities meetings would be held and subscription lists opened. But a difficulty soon occurred, the first sign of which was indicated by Mr. L. C. Probyn, Accountant-General of Madras. Writing to the honorary secretary of the Famine Fund Committee, on August 15th, Mr. Probyn stated that he thought the objects for which contributions were asked should be more precisely defined. He said;—'It would, of course, be useless for private subscribers to compete with Government in this matter, or to attempt to set up an independent agency, and I gather it was not the wish of the meeting that this should be done. But people, perhaps less interested in the matter than I am, will, I think, very likely refuse their subscriptions on the grounds that they are asked to undertake the work which Government has already undertaken, and for which doubtless the Indian taxpayers will eventually have to pay.'

" The subject had engaged the most anxious consideration of the Committee, who were fully alive to the impolicy of clashing in any way with Government forms of relief. No definite rules of relief had, however, been formulated, at the immediate outset of operations, but it was clearly understood that the money subscribed would be expended in aiding those whom Government organisations could not reach. There was no wish or intention in any form to attempt to relieve those classes for whom the authorities had made themselves responsible. The committee looked upon themselves as occupying a position analogous to that of the Red Cross Society in a warlike campaign. The organisation of armies of civilised states provided medical officers and ambulances, but when a battle occurred, it was always found that there was more than enough work for both

" official and voluntary medical men and nurses. The famine had already shown that, beyond the limits which the most philanthropic government must be careful not to overstep, there were multitudes who needed a helping hand extended to them to prevent them sinking into hopeless poverty; there were hundreds of thousands of others who, when rains came, would need assistance in the provision of grain for sowing, in aid towards purchasing oxen and ploughs for preparing the land, and thatch for the roofs of their houses. Those views were formulated in a series of resolutions passed at a meeting of the General Committee held on August 24. They were as follows:—

" (1). Contribution in aid of Local Committees for relief of necessitous poor not reached by Government aid.

" (2). Contribution towards the care of destitute children in (a) orphanages; and in (b) day nurseries; and the like.

" (3). Providing clothes for destitute women and children.

" (4). And to make allotments towards any other special objects which seem to come within the scope and ability of the fund.

" It had also been determined that committees should be formed in all the districts affected by famine, in accordance with a resolution which set forth that 'Collectors and European and Native gentlemen in the distressed districts be requested to form themselves into Local Committees for the distribution of such aid as it may be in the power of the General Relief Committee to place at their disposal.' Circulars were addressed to all the affected places with most unsatisfactory results.

" The Government of India had adopted an attitude towards the fund which absolutely paralysed all the efforts which the Committee were making. In India the Government is all in all. Any effort upon which the authorities look deprecatingly, or to which they give doubtful support, withers as though smitten with a plague. In the present instance, however, all effort was not checked, as the supreme and local Governments were at variance; the minor gods on the spot were propitious; it was only the occupants of the far-off Olympus who were opposed (under a slight misapprehension of existing circumstances) to private charity being exercised. Some people there were who dared consequences, and five Mofussil Committees were formed during the month of August. But, generally speaking, the movement hung fire. The way in which the misunderstanding between Simla and Madras became public was this:—

" In common with other Indian cities, in regions where famine did not exist, the authorities in Calcutta had been asked to convene a meeting of the citizens, and ask for subscriptions. No response was made to this appeal for a while. Neither was any reply vouchsafed by the members of the Supreme Government at Simla, of whom subscriptions were asked. In a somewhat circuitous manner it soon oozed out that the Viceroy and his Council were not well pleased with the action which had been taken in Madras. The public meeting in the Banqueting Hall and the appeal to England were looked upon as the acts of the Government of Madras, who were represented by a Journal which professed to speak the mind of the Government of India, as being in open revolt against their superiors. They were also charged with acting insubordinately in not asking permission of Lord Lytton to make the appeal; and further, in making it they had virtually confessed the inability of the authorities to cope with the disaster. It was a confession of defeat, a surrender by a General of Division when the Commander-in-Chief had no thought of surrender, but believed his forces capable of overcoming all difficulties. This reasoning was fallacious, but for a time was very powerful. The action that had been taken was not the action of the Government of Madras, who it was felt by the chief movers in the matter could not as a government appeal to the people of England or of any other country for assistance. But it was felt that the people of Southern India could open communications with the people of England, and that such a course would be right and proper. The movement, in its conception and carrying out, as has already been shown, was entirely non-official, and the Governor of Madras was asked to preside over the

" proposed meeting, not as Governor, but as the chief citizen of the Presidency, who, from his position, was peculiarly acquainted with the need that was alleged to exist, and who would be able to give such tidings as would carry weight. Yet further, not supposing for one moment that their desire to ally themselves with the Government could be misinterpreted into antagonism to the supreme authorities, it never entered the minds of the promoters of the movement to ask the Viceroy's countenance, which was assumed as certain to be rendered. It must, however, be conceded that there is something to be said from the point of view of the Government of India, the members of which were made by the appeal to appear wanting in a due appreciation of the facts. What reasons Lord Lytton and his Councillors had to urge for their action will appear in due course.

" The vague and unauthenticated statements which had been current for some time were confirmed towards the end of the month, and, just before the Viceroy left Simla, by circumstances which transpired in Calcutta. A meeting was held in the house of Sir Richard Garth, Chief Justice of Bengal, at Calcutta, to consider measures to be adopted towards raising public subscriptions in aid of the distress existing in Southern India. The effort had a wet blanket thrown upon it at the beginning by Sir Richard Garth stating that since the invitations had been issued he had received a communication from the Lieutenant-Governor of Bengal to the effect that the Government of India was not desirous that any action should be taken in the matter by private agency at present, as the Government felt quite confident of being able to deal with the sufferers by the famine satisfactorily. It was also urged that as Her Majesty and the Secretary of State had sanctioned the desire of the Viceroy that the resources of the Empire should be placed unreservedly at the disposal of the Government of India for famine purposes, nothing need be done at present, and nothing was done."

" Whilst feeling was thus being aroused and expressed, the executive committee of the relief fund, satisfied as to the necessity for their action, had bated 'not a jot of heart or hope,' but had continued appealing for subscriptions, meeting claims for aid, and laying the foundations of a widespread scheme of relief to extend wherever distress existed in India.

" As the time approached for His Excellency's arrival in Madras, there was much interest as to the course His Excellency would adopt towards a movement which had by this time given promise of attaining great proportions.

" On the morning after the Viceroy's arrival in Madras, in a semi-official manner the honorary secretary of the committee had interviews with Colonel O. T. Burne, private secretary, and other members of the Viceroy's staff, and it was understood that Lord Lytton would be willing to meet the committee and discuss with them the question of private subscriptions and the scope for private charity. A statement of this fact was 'circulated' during the day to members of the executive, who were to meet that evening in due course, that they might become acquainted with the business for consideration. With one exception, all the members who saw the notice were in favour of an interview which, it was hoped, would do away with the misunderstanding that existed. But when the committee met in the even-

" ing a different spirit was evinced. This will appear from the following passages extracted from No. 1 of the 'Weekly Statements' of the Famine Committee:—

" "The following telegrams from London were read:—

" "From Lord Mayor, dated August 27.

" "Twenty thousand pounds further herewith. Telegram in to-day's *Times* from Calcutta deprecating private efforts as Government will do all necessary, injurious. How does your Grace propose to dis-tribute our fund? During last famine a local committee was appointed."

" "From Sir NATHANIEL ROTHSCHILD, dated August 27.

" "By desire of Lord Mayor remit through Chartered Mercantile Bank further twenty thousand pounds. *Times* states this morning from Calcutta Government deprecates private charity. Unless officially contradicted will prevent further subscriptions.' It was resolved that the following telegram be at once sent to the Lord Mayor of London:—

" "Action Supreme Government unaccountable. Here notorious no Government efforts can reach certain distressed classes, private agency can Central Committee Madras manages fund, controlling local committees interior. Operations quite distinct from Government, not conflicting but supplementary. Large funds urgently required, delay disastrous."

" "An entry in the minute book of the committee shows that a telegram of the same purport as those from the Lord Mayor and Sir Nathaniel Rothschild had been received by a firm in Madras.

" "The Viceroy and the Duke having been made acquainted with these circumstances, met, and discussed the question in all its bearings till long after midnight, the outcome being a message to the Lord Mayor from the Duke of Buckingham and Chandos, couched in the following terms:— Message from the committee this evening went without approval, before I had opportunity of conferring with the Viceroy on the subject of *The Times* report respecting statement at Calcutta to which you refer. Viceroy entirely concurs that every facility be afforded to contributions of private charity towards relieving those cases of distress among the famine stricken people of South India which Government organisation does not propose to, and cannot undertake to meet, but was, and is, averse to Government calling meetings for levying subscriptions from Indian people who may have to bear heavy famine taxation. Hence probable origin of report. Funds will be managed by a central relief committee at Madras, and local committees, and not applied to relief of that distress which Government, by providing work and 'village relief can meet' A copy of this message was forwarded to the executive committee next morning. The Mansion House committee managed their share in the unfortunate difference very skilfully, and served to allay the suspicion which was being aroused in England that disputation and wrangling were going on in India.

" "Three days later in a *Gazette of India Extraordinary*, announcing the new arrangements made for the campaign, two letters appeared, Nos. 772 and 773 Governor General's camp, August 31st 1877.

" "The reply of the Government of Madras to a letter sent to them by the Governor-General was prompt and effective in showing that the relief movement was not an official one. It ran as follows (being signed by Mr Garstin, Secretary to the Famine Department):—'I am directed to acknowledge receipt of your letter of the 1st instant, No. 776, and to state that the Madras Government have taken no part in the matter of applying to the public for subscriptions in aid of famine relief, although, at the request of the citizens of Madras, the head of the Government consented to preside at a public meeting convened by the sheriff to consider the advisability of appealing to England for such aid.

" "I am to add that your letter will be communicated at once to the general committee of the Madras Famine Relief Fund, with whom rests the duty of administering the funds raised, with an intimation that the officers of Government in their official capacity will nowhere be allowed to be disburers of any funds which may be placed at the committee's

1 "communicated" paragraph to the Calcutta *Englishman* gave the following details of the meeting:—"At the private meeting held by special invitation at the house of Sir Richard Garth, on Saturday afternoon, to consider what measures should be adopted towards raising public subscriptions for the relief of the sufferers from the famine in Southern India, as suggested by the circular of the committee appointed by the public meeting lately held at Madras, all classes of the community were represented. Sir Richard Garth opened the business of the meeting by explaining that since the invitation had been issued, he had received a communication from the Lieutenant-Governor to the effect that the Government of India was not desirous that any action should be taken in the matter by private agency at present, as the Government felt quite confident of being able to deal with the sufferers by the famine satisfactorily. Several gentlemen present expressed then their views on the subject. But, it appearing to be the general opinion that the position of Government had been improved by the sanction received from Her Majesty and the Secretary of State for India to place the resources of the Empire unreservedly at the disposal of the Government of India for famine purposes, it was decided to take no steps to appeal to the public at present. At the same time, it was decided to intimate to the supporters of the movement for raising private subscriptions that at any future time, if it becomes necessary, the committee is willing to give its services to devise the best means of carrying out the proposals, and to devote all its energies to the cause of public charity."

" 'disposal, although the Government has no reason to suppose that the committee are relying on the agency of State establishments for the administration of their private funds.'

" When referred to the relief committee the correspondence was simply acknowledged, with an observation that the committee note the remark of Government, that Government servants in their official capacity will not be permitted to dispense the funds of the committee, and that the wishes of the Government will be carefully observed.

" As soon as money had been received in large sums the claims of other parts of India outside the Madras Presidency were considered. Early in September a grant of one lakh of rupees was made to Mysore, and half a lakh to the Deccan and Khandeish Committee at Bombay. Willingness was also expressed to send aid to Hyderabad, but Sir Richard Meade, the Resident, after conferring with Sir Salar Jung, came to the conclusion that assistance was not needed. Grants were made on two occasions to Sir Henry Daly for distribution to famine-stricken people in Central India.

" With the month of September a new departure was made by the committee in the direction of more efficiently and widely disbursing the funds which had been entrusted to them. Owing to various causes the process of forming committees in the Mofussil was very slow, and it was determined to send two gentlemen—one north, the other south—into the districts for the purpose of reporting upon the state of affairs and forming committees. The delegates chosen were the Rev. J. M. Strachan, M.D., of the S.P.G. Mission, and F. Rowlandson, Esq., a solicitor of Madras. Their travelling expenses were provided for, and an honorarium of Rupees 1,000 per month each was accorded. The instructions given to the delegates were that they were to organize, as far as possible, local committees in different parts of the various distressed districts, to be in direct communication with the General Famine Relief Committee at Madras for distribution of famine funds. Also to organize special agencies where local committees could not be formed, or sub-agencies were likely to be more efficient.

" They were reminded that 'the fund was designed to relieve the necessitous poor whom Government cannot or do not reach, and care is necessary to avoid even indirect interference with Government operations. Under the above designation may be included those who are not ordinarily reckoned poor, but who are rendered dependent by the present distress. While Government operations have for their object the salvation of life, the funds may be legitimately applied to the mitigation of intense suffering.' The general committee, they were informed, would be prepared to make pecuniary provision, if necessary (within reasonable limits), for preparing local accounts, and for all necessary expenses connected with the distribution of the funds.

" These and other points were noticed to indicate generally the committee's wishes, but the deputation were left a wide discretion, and the committee relied on their making the best arrangements which the circumstances in each locality admitted of, within the scope of the funds and the general principles above enunciated. The committee looked to the deputation for practical suggestions for the more efficient and prompt distribution of the funds, and the objects to which they or the local committee desired to apply them. Copies of these instructions were sent to the chief places in each district in advance, to prepare the way of the delegates, and were of much service in this respect.

" Even this measure did not serve to remove all the difficulties in the way of forming committees. The Government of India were believed to be still averse to private charity, and official and quasi-official assistance was therefore not given; indeed, more than negative harm was done, positive evil resulted. The executive committee, on September 19, therefore determined to take advantage of the Viceroy's continued presence in the Presidency, to procure permission for officials in their citizen capacity to render service. His Grace the Governor was with His Excellency the Governor General at Coimbatore when the following telegram was despatched from the executive committee in Madras: 'Famine relief committee respectfully suggest publication of an announcement by your Grace's Government that

" 'there is no objection to the cordial co-operation on the part of Government servants in the distribution of the almost national charity of the English people which is reaching this committee. In the absence of such announcement the committee anticipate great difficulty in meeting the expectations of subscribers. Mofussil committees can scarcely be formed without the aid of collectors, judges, and others. Our information shows that officers of all grades seem doubtful as to the propriety of co-operating under existing circumstances. It is very desirable that this doubt should be removed.' Letters were also sent officially to Government embodying the foregoing statements. The Governor conferred with the Viceroy, and at a meeting of the executive committee held in the following week, the Chief Secretary of Government, Mr. D. F. Carmichael, attended, and handed in a copy of a notification just issued from the press, which was as follows:—'It is the desire of Government that public servants of all grades should give all the assistance they can render, without detriment to their official duties, to the formation of local committees, and generally to promote the object which the Famine Relief Committee and subscribers to the famine relief fund have in view.' This removed all doubt and difficulty, and, with one or two exceptions, Government servants most zealously assisted in the work of relief."

Such is the history of the inception and practical foundation of the fund. As the point of Government intervention in private relief appeals comes prominently forward later in this Memorandum, the incidents given in the foregoing passages become of some value.

II.—THE MODE OF DISTRIBUTION OF FUNDS

This division of the subject groups itself into a series of facts which may be taken *seriatim*.

(a) *The Means by which Committees were formed in the Mofussil.*

When the Viceroy was in Madras, Sir Stuart Bayley and Mr C. E. Bernard expressed to me doubts as to suitable persons being available for service upon committees in the Mofussil generally. In reply to this objection I endeavoured to show that, counting officials not in the revenue line, whose services would not be required by Government for State famine relief, non-official Europeans in trade and others, missionaries, and native gentlemen, we believed no trouble would be experienced on this head. Nor was there. Large and trustworthy committees were formed in all the taluqs of the affected districts. At one time at least 120 committees were in active operation with nearly 2,000 gentlemen giving arduous, zealous, and unpaid labour. I cannot mention the numbers exactly, as many of the committees with which the Executive dealt had many sub-committees under their guidance, e.g., in Tanjore there were over 12 sub-committees with an average (I think) of 10 members each. Under the circumstances described on a previous page, by circular and through gentlemen on deputation, before the first week of November the task of organizing local committees, sub-committees, and agencies was complete, and the two gentlemen who went on deputation returned to Madras. Their labours had been very successful. Where committees were already in existence the delegates had been useful in stimulating and directing action, particularly with regard to the outlying taluqs, whilst, where no committee formerly existed, good working bodies of members were formed. The consequence was that, speaking generally, there was not, in November 1877, a taluq in the whole of the distressed districts which was not more or less completely feeling the benefit of the unexampled generosity of England, the colonies, and some continental countries, in the latter being included France—which subscribed through the Catholic missionaries—and Germany and Switzerland. The two countries last named sent nearly Rs. 40,000 to the Basel missionaries who labour in the western portion of the Madras Presidency and in the southern districts of Bombay. From the Kistna river to Cape Cormorin most active relief operations were proceeded with, some of the distributors labouring in their self-imposed task with much energy and self-sacrifice. One gentleman spent over a week in a bullock cart visiting the distressed villages in a part of the region covered by the committee to which he belonged, giving aid to those whose cases had been previously investigated, and making further inquiries himself. This solitary instance would need to be multiplied vastly if justice were done to the zeal and discretion with which

the funds were distributed. The various proceedings of committees published from time to time showed the wisdom of many of the arrangements made by sub-committees. The general committee felt that the discretion given to the sub-committees had been most wisely used, and the determination early arrived at, not to fetter their action with rules which local circumstances might render inoperative or *mal à propos*, was justified by events. By the period already named over 22 lakhs of rupees had been placed at the command of local committees. The feeling, however, was general in the Executive committee that the money was not being distributed fast enough; and at a meeting held on October 25th, a minute by Mr. Balfour, indicating the necessity for a prompt and early distribution of the funds, was read. This will be noticed subsequently.

Reference has been made to individual agencies for the distribution of funds. These existed in places where it was not possible from various causes to form committees, e.g., there was no non-official gentlemen available, and no officials who were not engaged in revenue or famine duties. Occasionally the latter were engaged in the relief distribution, but generally as members of local committees, seldom or never as individual agents. The kind of relief administered by individual agency, next to giving food for the support of life, medicine, and clothing, may be gathered from the following particulars from the Rev. A. D. Rowe, who was, perhaps, the most successful—in his mode of relief—of the private agents to whom funds were entrusted. He says:—

“Dachepalli, Palnad Taluq, Krishna District,
“February 6th, 1878.

“I beg to call your attention to the distress still existing in this taluq. Having been called here by urgent business for a few days, I have been able to see and hear also through reliable witnesses that there is still very great distress for want of food among the poorer classes. This taluq has suffered more than any other in the district through the famine. In November of last year a tolerably good crop of cholam was harvested, and for a while the condition of the people was somewhat improved, but now grain is very dear again—getting dearer yet daily—and there is no work for the poorer classes. What little work there is in the fields the ryots do themselves, and the outlook is very dark indeed. Having heard that I have been giving work to the people south and west of Guntoor, the people flock to me in search of work, offering to do it at any rate. There being no European residents here except a few Roman Catholic missionaries, the wants of this taluq have not heretofore been brought to the notice of your committee.

“Your committee is aware of the system of relief we have adopted, namely, that of giving work such as spinning, shoemaking, and weaving, in Bapatla taluq and Westward. By this system a small amount of money is made to give a great extent of relief.

“If you will kindly give us a small grant for this taluq we shall be able to carry on the relief at a very small actual loss, i.e., we shall be able to sell the goods to the north of Guntoor at probably 75 per cent. of the cost. You see therefore that a thousand rupees relief given by your committee in this manner is equal to about 3,000 distributed gratuitously.

“Until the rains come in June there can be no improvement here.

“Westward towards Veldurti and southwards to Vinakonda the distress is greater than here. Of course we shall give the most help there if you send us funds.

“At this place there are three native gentlemen who are quite willing to assist in giving relief by means of work. They are the Hospital Dresser, and Overseer in the D. P. W., and the Rev. B. John, an ordained native pastor in our mission. At Veldurti there are also several native gentlemen who will assist so far as possible. The plan of giving work is however easily managed, and I shall be willing to give all my time and attention to the relief you have entrusted to me, and may still entrust to me, until the condition of the poor people is improved. As a temporary beginning I have bought cotton to the value of Rs. 200 to be given out to spin to very poor women. If economically managed, I think Rs. 4,000 would employ those most in need of help for the next five months. I do not ask for the whole amount at once. If you will kindly grant us Rs. 2,000 for the Palnad Taluq we shall be able to put the relief under way, and carry it on for at least two months, and do an immense amount of good. Meanwhile, if other sec-

“tions have not greater claims, a further grant may be given us. Your letter enclosing cheque for Rs. 2,000 has just this moment reached me by tappal from Guntoor. Many thanks for it, and for the encouraging words accompanying it. As you have kindly increased the grant above what I asked for Bapatla, I shall take the liberty to use a part of it at once for the Palnad, where I think the need is even greater than in Bapatla.

“In regard to the question whether the cheap cloths will not damage the business of the weavers in general, I may say that I have from the start done my best to avoid that. Since the cold season is about over now, I have made a few new rules in regard to the sale of cloths.

“1. I have raised the price somewhat.

“2. I sell only to weavers, except in very rare cases; that is, the weavers have the first chance to take and sell the cloths which they have made for me. The buying of cloths is not restricted however to those weavers who are on the relief. This rule applies to such cloths as are sold in the famine districts. The bulk of the cloths now are taken by weavers to the districts north and west, where the famine is over, and sold there at prices slightly less than ordinary rates. I have given a good deal of thought to that part of the business, and this is the best I have been able to devise. I should, however, be glad for any suggestions.”

(b). *The part taken in Distribution of Private Charity by Government Officers*

From the first the Government of India were averse to revenue officials, whose duties during the famine were exceedingly heavy, taking any part in private relief distribution. This objection was expressed in a letter from Sir Stuart Bayley to the Government of Madras, in which it was stated that “in the villages His Excellency apprehends that, outside the chain of relief organisation subordinate to the Collector it will be difficult to find the requisite agency and Lord Lytton deprecates the diversion of this organisation to purposes other than those of Government relief. This objection is not based on imaginary grounds. Experience has shown that, when the Government relief organisation has been placed under the orders of a central committee, it has led not only to the Collectors being burthened with additional work, having to submit double sets of returns, and to correspond with an additional master, but also to a considerable amount of friction and some unseemly discussions between Government officials and their superiors.” No friction whatever and no unseemly discussions marred the course of relief distribution in Madras. After a short time Collectors and other revenue officers, with the consent of the Government of India, rendered appreciable assistance in the formation of committees by giving their countenance and affording information. Only towards the end of 1878, and that in a few cases merely, did Collectors actually take part in the proceedings of local or district committees. So far as relief was administered in the Madras Presidency it was through judicial officers of Government, members of the Survey Commission, and non-official gentlemen, European and Native.

In Mysore an exactly opposite principle was adopted. Except in Bangalore and Mysore city the whole of the relief (I believe) amounting, from the General Fund, to sixteen lakhs and a half, was disbursed by special famine and other officers. Mr. Elliott, C.S.I., will be able to inform the Commission upon this point; meanwhile for the information of my colleagues on the Executive committee I may quote the following passages from Mr. Elliott's recently-published report on Mysore famine administration. Mr. Elliott writes:—

“The remaining form of relief, the administration of which in these latter days took up most of the special relief officers' time, was the distribution of the charitable funds. The Madras Committee who were the recipients of the subscriptions sent from England and the colonies for the famine in the south of India, decided that Madras and Mysore should share in the proportion of three-quarters and one-quarter of the total amount; and thus at intervals of time, Rs. 16,53,903, or sixteen and a half lakhs of rupees, were handed over to be spent in this province.

“The central committee, in whose ranks all classes of officials and non-officials were represented, received the money, and the members of this com-

"mittee distributed it to the towns of Bangalore and Mysore and to the district and special officers in charge of the different taluqs of the province according to the best information they could get as to their relative necessity. At the beginning several mistakes were made, and experience had to be gained at the expense of some wastefulness. There was much discussion at first as to the proper objects on which the money should be spent, and the best channels through which to disburse it. The principal difficulty that met us was this, how can charitable funds be expended without waste on the one hand, and on the other hand without trenching on the province of Government, which is bound to save life? The manner in which this question was answered as far as regards distress in the town of Bangalore has already been described. As regards the people who were already in receipt of Government relief, the first answer that suggested itself was to provide for them such comforts as are almost, but not quite, necessities. It was therefore decided at once that a proper field for the expenditure of charitable funds would be to supply hospital comforts to the sick, and clothes to the numerous paupers in relief camps or relief works who were in extreme want of them. With this object, thousands of male and female cloths were bought till the local market was drained and supplies had to be obtained from Madras, and a demand was created which made the weaver's trade quite brisk. But it was soon discovered that, however carefully managed, the distribution of cloth was most demoralising. An officer would go into a relief camp and give out cloths to every inmate; next morning they would all appear in their old rags, having mysteriously made away with the presents. Warned by this experience, he would insist on the recipients of new cloths bringing their old ones to burn before him; still in some unaccountable way the exchange of old cloths for new went on. Or on a relief work he would pick out all the people that were badly off for dress, and give cloths to these, not allowing those who were fairly well dressed to participate; next morning all the excluded ones would shew themselves in a state closely approaching to nudity. It was rumoured that they sold for 3 or 4 annas the cloth which had just been given them at six times the cost, but though efforts were made to buy up these second-hand cloths in the market, not much success was obtained. Before long this form of charity fell into disrepute; the gift of cloths being reserved for a special occasion, to encourage labourers marched from one work to another, or as a reward for a large task performed, but to the last, whenever relief officers came to inspect a work, the general cry of the women was 'batla' (short for 'batte-illa,') 'no cloths.'

"Some of the charitable fund was also spent in journey money to assist people who could not labour, who had wandered in from a long distance, and who wished to return home; and a good deal was spent in doles of cash. This was, however, perhaps the least satisfactory mode of all. There were instances in which a grant of money was excusable, as, for example, when the inspecting officers found a woman with a family whose husband had gone away to coffee, and had been unable to remit her any part of his pay; he would probably come home in two or three months, and there was no serious objection to giving her a little help to tide her and her children over the interval. The same argument would apply to a hungry ryot with a ripening crop. But, in most cases, to give money to paupers, because they were poor, with no definite object on which they could spend it, and no ground for supposing they would be better off after it had been spent than at the time of receiving it, was merely to demoralise them by accustoming them to live on and to expect unearned charity. There were many cases in which it was very hard to know what to do to help a poor creature, and it seemed cruel for any one with money in his pocket, entrusted to him expressly in order that he might relieve the poor, to refuse to give; but by degrees even those who were the greatest strangers to political economy began to see the evil of such a procedure and to hold their hands.

"In fact, within about a month from the time when

"the central committee began its sittings, it was established as a principle that the main use to which the money should be put was in restoring people to their ante-famine condition, setting them up again with the implements of their trade, and a little capital to work on, and thus enable them to support themselves. And the principal class to be helped were cultivators, who had lost their bullocks through death or robbery, and who, unless they could repurchase them, could never hope to resume their hereditary position, but must sink to be field labourers and common coolies for the rest of their lives. It was also suggested by the committee that where land had gone out of cultivation through the total extinction of a ryot's family, an effort might be made to raise a field labourer to the rank of a ryot to fill the vacant place.

"The following statement shows the manner in which the relief committee apportioned the charitable funds at their disposal to the different districts and to those heads of expenditure to which grants were allotted independently of the district officers:

	Rs
Grants to Famine Orphanages - - -	1,00,620
" other orphanages and schools - - -	4,370
" in aid of Charitable Institutions - - -	26,550
Grants for medical comforts to Hospitals - - -	7,500
" clothing throughout the province - - -	91,986
" relief, Bangalore Municipality - - -	2,04,409
Bangalore District - - -	1,96,000
Kolar - - -	1,53,500
Tumkur - - -	3,84,000
Chitaldrug - - -	2,12,700
Shimoga - - -	28,500
Kadur - - -	39,500
Hassan - - -	1,35,000
Mysore - - -	68,500
Charges for establishment - - -	765
Total - - -	16,53,900

"At the time of writing, the completed accounts of only about half this expenditure have been made up. About one-third of the amount had been spent on buying bullocks, indicating that altogether some 27,500 cultivators have received each a pair of bullocks, at an average cost of Rs. 20 the pair. About 20,000 artisans have similarly been started afresh with the implements of their trade to earn their bread with self-respect and industry. The mind can hardly grasp the meaning which these figures convey, or realise the blessings which the distribution of this charity imparted to countless families in Mysore."

(c). *Funds Received. Principles upon which they were Distributed.*

The sums placed at the disposal of the Executive Committee amounted to Rs. 81,45,829-15-4. From countries outside of India the amount received in sterling was 692,603l 17s. 3d. It should be borne in mind that there were many indications that this sum would have been largely exceeded had not the executive committee, in November 1877, telegraphed to ask that the fund might be closed, sufficient funds being in hand to meet all probable necessities. The sum of 692,603l 17s. 3d., by virtue of a favourable exchange (to India), realized Rs. 78,40,073-5-8. To this must be added Indian contributions amounting to Rs. 3,05,756-9-8, making a total receipt of Rs. 81,45,829-15-4.

It was early recognised in the history of the committee that the objects upon which relief should be given ought to be definitely and clearly laid down. This was done. Systematised in the account forms supplied to the local committees, the forms of relief were as follows:—

- I.—Support of Life (Food, Money Doles, &c.).
- II.—Orphanages.
- III.—Day Nurseries.
- IV.—Clothing.
- V.—Providing or Repairing Houses.
- VI.—To Cultivators for Seed, Bullocks, &c.
- VII.—Miscellaneous Charity.

Whilst broad principles were laid down for the guidance of local committees, these committees were permitted, in some cases were invited, to frame special rules for their own guidance. They complied with this request in the majority of cases. One instance of this may be cited, this instance having the merit at the same time of showing the earnest spirit in which the work of relief was undertaken by the members of committees generally. The Tripalore Committee had for

* A woman's cloth or "sari" cost in Bangalore about R. 1-10 to R. 1-12

A man's cloth or "panche" cost about 5 to 9 annas.
A girl's cloth or "kerige" cost from 6 to 12 annas.

its chairman the Rev. M. Phillips, of the London Missionary Society. The following was its course of procedure as described by Mr. Phillips. —

“ The taluqs of Tripatore and Uttengerry, which are in charge of the head assistant collector, Mr. LeFanu, contain a population of about 350,000 in 740 villages. The Uttengerry taluq is as large again as the Tripatore taluq, and is suffering from famine as severely as any taluq in the district except Darmapoory.

“ The mode in which the committee proposes to work these taluqs for relief purposes is the following. — The taluq of Tripatore is divided into eight, and that of Uttengerry into sixteen divisions, each division containing about thirty-four villages on an average. The members of committee have each undertaken to visit all the villages in one or more divisions, to go from house to house and to inquire into the circumstances of every householder, and to enter on the spot in a book made for the purpose the name of the person entitled to relief, the amount of kist paid on his land, and the amount within Rs. 20 to be given him. If his case be such as to require more help than Rs. 20, a note is to be made of it for the favourable consideration of the committee. Then a ‘ticket’ is given to the individual, with a number on it corresponding to the number opposite his name in the book, and he is told to come to the taluq town any day after the 20th instant to get the sum allotted to him. The object of fixing this date is twofold—1, that sufficient time be given to the delegates to prepare their lists and get them passed by the committee; and, 2, that sufficient time be given to the Madras Committee to arrange for remitting the sum asked for. The method entails much labour, but we are convinced that it is the *only efficient plan* of carrying out the intention of the Relief Committee. The list of gentlemen who have volunteered to carry out this plan in these taluqs, which I append, will show you that money placed at the disposal of this committee will be utilised in the best possible manner to meet the necessities of the distressed.

“ The urgent necessity of having the money placed at once at the disposal of the committee arises from the fact that unless cultivators are assisted within fifteen days to sow their fields, the season for sowing will have passed away and the opportunity of helping them lost for the present. I trust, therefore, that the sum asked for will be sanctioned without delay.

“ Our calculation of the probable sum required is made as follows:—From inquiries made by me in some villages, I conclude that an average of ten cultivators in each village will require help on an average of Rs. 15 each. In 740 villages this will amount to Rs. 111,000, which is a little more than the sum asked.

“ This committee agree with the Madras Committee that it is very desirable to have some general standard by which grants to ryots in a Collectorate should be regulated. But this is very difficult, and indeed impossible under the circumstances, if our aid to ryots is to be of real value. The time required for conference and discussion by committees before such a standard could be arrived at is the very time in which the ryots should sow their fields, and hence in which the aid of the committee would be of any permanent value to them. Besides, the necessities of ryots in different parts of the same districts vary, and hence the average amount to be given must also vary. When I wrote my letter of the 13th, my calculation of the probable sum required for these two taluqs was based on my experience in some villages in the southern part of the district. In those villages I found that small cultivators had either died, left their

“ villages, or had lapsed to the class of coolies; and that only the more respectable had remained at home, greatly reduced in circumstances, in fact, in a state of great destitution. Hence I calculated that there would be an average of ten persons in every village who would require help averaging Rs. 15 each. I have been this week visiting villages in this taluq every day, in order to prepare a list of such as are entitled to relief from the committee, and I find that the average number in each village is as much again, but that the average sum required by each person is less by one half. That these villages are not a fair sample of all villages in the taluq I feel certain, for they are those which have suffered least from famine. The general principles on which this committee give help to cultivators are these:—

- “ 1. Not to help such puttadars as can obtain a loan from Government.
- “ 2. Not to give anything towards buying bullocks.
- “ 3. Not to give money to any man unless the village ‘moonsiff’ and others testify that what he says about his circumstances is true, and that he will use the money given him for cultivation.
- “ 4. To help cultivators who have cattle to procure seed grain.
- “ 5. To help such as have neither bullocks nor seed grain to buy the latter and hire the former.
- “ 6. To help those whose houses are either wholly or partially destroyed.

“ Our plan of operation is such as to secure full and correct information of every cultivator, and so of enabling us to give according to the relative wants of each individual, from Rs. 1 to Rs. 20.”

As soon as it became apparent that a very large sum would be at the disposal of the Executive, viz., early in October, the committee, finding it had nearly fifty lakhs of rupees, and that its existing system of making grants in response to applications did not provide adequate means for disposal of the money, determined to make allotments proportionate to districts. Thirty-six lakhs were taken for this purpose, and the remainder reserved to meet claims outside the scope of the allotments, such as the proportion for Mysore, Bombay, and other places. It was also understood that as the amount subscribed increased the sums could be proportionately added to; Mr. G. A. Ballard, member of the Board of Revenue, who was upon the committee, expressed his willingness to prepare a statement in accordance with these suggestions. This was done, the basis of allotment being the intensity of distress as revealed in Government reports. The method of calculation adopted was briefly this: the number of persons in Government relief of all sorts was taken and compared with the total population as indicating the intensity of distress in the various districts. The proportion of agriculturists to the general population was taken from the census returns. One-third of the thirty-six lakhs was apportioned to non-agriculturists, whilst the remainder (twenty-four lakhs) was apportioned to the agriculturists paying under Rs. 50 Government assessment.

The results worked out a fair idea of distribution. They had been modified to some slight extent from general information available, and it was believed the statement given below might be accepted as being an equitable allotment. On further consideration it was found that there were not data for properly distributing the sums to sub-divisions or taluqs, and it was thought that operation might safely be left to the local committees, assisted as they were by revenue and other Government officers of experience. Particulars were as follows:—

DISTRIBUTION OF THIRTY-SIX LAKHS OF FAMINE RELIEF FUNDS.

District.	Allotment to non-agriculturists.	Allotment to agriculturists, generally pattadars under Rs. 50.	Total
	Rs.	Rs.	Rs.
1. Bellary -	2,25,000	6,75,000	9,00,000
2. Salem -	1,60,000	2,90,000	4,50,000
3. Kurnool -	1,80,000	3,20,000	5,00,000
4. Cuddapah -	1,60,000	3,40,000	5,00,000
5. Coimbatore -	1,19,000	1,81,000	3,00,000
6. North Arcot -	95,000	1,55,000	2,50,000
7. South Arcot -	18,000	82,000	1,00,000
8. Chingleput -	75,000	1,25,000	2,00,000
9. Madura -	53,000	97,000	1,50,000
10. Nellore -	1,15,000	1,35,000	2,50,000
Total	12,00,000	24,00,000	36,00,000

This plan was adopted, and applications then before the committee were dealt with on the basis of this scheme. For the guidance of local committees it was decided that a letter should be prepared, of which the following is a copy of that sent to the honorary secretary of the local committee at Kurnool:—

"The Madras General Famine Relief Committee believe that their operations and those of the respective local committees will be facilitated and rendered more effective if a fairly definite idea is arrived at as to the amount of relief to be distributed in different localities

"2. The general committee find they are in a position efficiently to allot sums to collectorates, and perhaps to taluqs. The arrangement of the farther more minute territorial and individual allotments will fall to the local committees and sub-committees under the general principles that have been, or may be from time to time, indicated.

"3. Local and sub-committees have been pretty generally formed already, but the general committee is not satisfied that all parts of the distressed tracts come within their action. If there are any tracts that have been hitherto omitted it is very desirable they should now be arranged for either by bringing them under an existing local committee, or by a new committee or agency being forthwith started.

"4. The general committee find that the sum for apportionment over the Kurnool collectorate will not fall short of five lakhs of rupees. The committee consider this sum may be best utilised by distributing approximately one-third to relief of the general distressed population, and two-thirds to assist agricultural operations by money grants for hire of bullocks, for seed grain, implements, &c. Generally the relief should be given to ryots whose puttars are under Rs 50

"In the Kurnool collectorate there is one local committee at Kurnool. Does this committee operate over all the taluqs noted directly or through local sub-committees or agencies? If not, I am to request your committee will be good enough to take the earliest possible opportunity of conferring with the collector, and with the collector's concurrence, if necessary with any of the division or taluq officers, and arrange either for bringing the taluqs where relief has not hitherto been provided for within the scope of your own operations, or recommend to this committee how the said taluqs may best be reached and receive their due share of relief"

After some discussion the proposals were agreed to, and a rider added in the following terms:—"The general committee, whilst indicating the above proportion of distribution, do not wish to bind the local committees by any hard and fast line. The general committee leave to the local committees, and look to them to exercise, a judicious discretion in making actual distribution both in regard to classes of the population and in regard to individuals." These resolutions were printed as a memorandum and forwarded to all committees and agencies next day. Thenceforward the work of distribution proceeded with little delay or interruption.

In every step that was taken by the executive, district, and local committees the utmost anxiety was evinced to avoid clashing with the operations of the Government. It is a matter of great pleasure to the executive to be able to state that in no case was there any serious clashing of interests, and when, towards the end of the famine, one or two slight jarrings occurred they were easily and amicably settled. It may, perhaps, be stated here that the most harmonious relations marked the connection between the executive and the various committees and agencies. Only on one occasion did a serious difference of opinion arise, and that was satisfactorily arranged with little difficulty.

Of the success which has attended the modes of relief adopted, it may be fitting here perhaps to quote the testimony of the Government of India in a despatch (No. 42, Calcutta, December 21, 1877) to the Secretary of State for India. The Government say:—" * * * In their Weekly Statement of the 20th October, the executive committee laid down the general principles, which have since guided their expenditure. With the assistance of the Government officials in the districts, and by the agency of two of their own

"delegates, they established sub-committees and agencies all over the country, numbering by last reports no less than 110; and to these sub-committees they entrusted the expenditure of their funds, with general instructions that two-thirds of the sums supplied were to be expended in giving to agriculturalists the means of starting afresh in their calling, by assisting them to rebuild their houses, and to re-purchase bullocks and implements of agriculture, &c.: the one-third was to go towards relieving the destitute classes not reached by the Government agency.

"How this latter part of the scheme has worked, and whether it has clashed in any way with the relief given out of Government funds, we have no information; but as the district officers must of necessity be the backbone of the sub-committees, and as the instructions of the committee have been precise and explicit, to avoid all appearance of interference with the action of Government, we presume that, although the operations of the committee must at some points have overlapped those of Government, yet, on the whole, the money has been usefully expended, and that no friction has taken place. In regard to the main scheme, however, of settling up agriculturalists, we have explicit testimony, borne by several officers, to the excellent effect it has had in preserving the self-respect and position of the ryot; saving him from sinking to the condition of a day-labourer, and enabling him to turn, to the best advantage the favourable prospects of the season. We do not think a more judicious method of expending the bulk of the vast sums, placed at the disposal of the committee, could have been devised, and it has doubtless done incalculable good; and our heartiest acknowledgments are due to the committee for this result, and for the care they have taken to avoid friction, or interference with the measures of Government."

This is the general opinion of those who watched the effect of the distribution of the fund. An immense deal of good was done at the minimum of cost.

(D).—Facts of Relief.

Of the real nature of the good done by the fund three typical cases may be given, one from an ordinary Madras district, the second from a Zemindari where the local committee had the advantage of one or more Europeans upon it, and the third from the province of Mysore

"(1).—RELIEF IN THE MADURA DISTRICT.

"DINDIGUL, 17th November, 1877.

"We are now progressing well with the work of distributing the funds placed at our disposal. We have already sent out into the villages Rs 18,003, most of which has been distributed, leaving us at this present with a balance of Rs. 7,000 in hand. It has already been necessary to modify our original plan of distribution. In that we depended principally upon the services of the village officials for the distribution of relief, their work being controlled and attested by honorary members of the committee, consisting chiefly of the principal ryots residing in the villages. We soon found these officials were not trustworthy. In most cases there was delay in bestowing relief, and greater delay in submitting reports and returns. During the famine these men have had much extra work thrown on their hands; for example, the distribution of money doles in their villages, while their only pay was a piece of *manippa* land, which in the famine brings them in nothing, and is a loss to them by the amount they have expended upon it. Is it surprising that with daily facilities for misappropriating money, and with the pressure of the famine upon them, they recouped themselves for their work and time by retaining money which should have relieved needy villagers? I have no hesitation in saying that the village officials have been demoralised during the famine. It would have been money well spent if funds which have gone to import men and horses from other parts of India had been employed in rewarding these wretchedly remunerated village officials for the substantial and responsible work they were called upon to perform. As it was, a short experience proved that it was inexpedient to employ them; and the honorary members, who were appointed without a reference being first made to them, proved in the majority of cases either unwilling or incompetent to do our work.

"In this state of things we had to look around for

¹ 1. Pattikonda.

2. Ramukota.

3. Nundikotkur.

4. Markapur.

5. Cumbum.

6. Nundial.

7. Sirwell.

8. Kailguntla.

other agencies which were fortunately at hand. The Rev. J. S. Chandler, of Battalagundu, undertook the distribution of funds, directly, or by the aid of his catechists and teachers, in sixty villages. The Rev. E. Chester allowed his subordinates to take charge of forty-one villages. The Rev. L. St. Cyr and the Rev. A. J. Larmey, Roman Catholic priests, had the distribution in thirty-one villages allotted to them; and the special Deputy Collector, Subba Iyer, undertook relief operations in forty-three villages; while I employed agents in seventeen villages. This makes a total of 197 villages thus provided for out of 204 in the taluq. The distributors are all strongly urged to avail themselves of the local knowledge of the village officials and principal ryots while bestowing relief.

"We find this plan works very well. The committee appoints the proportion of relief to be given in each village. Special cases needing extra assistance must be referred to the committee. Occasionally a village headman refuses to attest the registers and tickets because he is not paid for it and it is not Government work; but a substantial ryot can always do this duty. At times the distributor has been urged to divide a certain proportion of the funds with the village officials, and in one case the goomastah of a village moonsiff kept back a portion of the money dole, on the pretext the persons owed money to him. We have not yet met with any case where the distributors have taken a part in, or connived at, wrong-doing of this sort. This committee acknowledge with pleasure the earnestness and promptitude with which the various distributors have entered upon this charitable duty.

"The suffering in the district is still great, and must needs be till after the harvest is gathered in. At Rettiapetty, during the short time the agent of this committee was there bestowing relief, three persons died of starvation. Out of thirteen children sent to me a fortnight ago, five have already succumbed, and others remain in a very precarious condition. I have started an orphanage, in which there are at present 124 children. Within the next week the number will reach 150. Some of the children sent from the outlying districts are in a most deplorable condition, and the utmost care and attention fails in many cases to save them.

"There are villages where special help is needed. In some places almost the entire village has been burned down by thieves who hoped to profit by the confusion. For example, the village of Malliappanpati consisted of two or three streets of Roman Catholic and one row of pariah houses. The houses were fired and all destroyed, with the exception of the pariah houses. This happened some months since, yet many of the villagers have been unable to rebuild their houses, and seek aid from us.

"We are thankful for the means placed at our disposal for relieving the general distress, and trust that, as the sum already allotted to us will soon be expended, the general committee will give us a further grant of Rs. 10,000 for the month of December.

"P. S.—I had scarcely completed this letter, when a communication from a member of the committee came to hand, from which I extract the following paragraph:—

"A young man died at our church-door last night. A Chakkha boy died, and the body was left unburied for five days in Pangulapattu. In Athoor, when they were distributing relief, a man who stepped forward to receive his dole at the call of his name died from the effort before receiving the dole.—
W. YORKE

"(2) RELIEF IN A ZEMINDARI.

"This committee was formed on the 28th of November as a sub-committee, under the head committee of Chittoor North Arcot; and on the 29th of December became an independent committee in direct correspondence with the general committee, Madras. On the formation of the committee the members decided that money should be given under the following heads:—cattle; seed; houses; cloth; miscellaneous, including money doles; and subsequently relief to weavers, under the head of miscellaneous relief.

"The Maderpauk Division, the scene of the labours of this committee, is the southern portion of the Kalastri Zemindari of the North Arcot District. The Division contains 178 villages, not including hamlets; the population of which in 1871 amounted to 73,085: half to two-kinds of these are ryots, or

"people who earn their livelihood by agricultural pursuits. The greater number of the ryots, of whom the population chiefly consists, are always exceedingly poor, much more so, than in villages belonging to Government, for the following reasons.—The ryot who ploughs and cultivates the land, has no real right of occupancy, and hence has no interest in improving his land by sinking wells and manuring it. The effects of this system can be seen at once on comparing the *Inam* villages of the Zemindari, with those directly under the Zemindar's control. In the fields of the former there are wells, the land is manured, and the owner consequently gets good crops and is generally well-to-do, living in a good substantial house. In the fields of the latter, there are no wells; and the fields having no fixed occupants, are not manured, and consequently give but a poor return to the labour expended on their cultivation; the villages attached to the lands have invariably a poverty-stricken look.

"The Zemindar Venkatappa Naidu, c s r, collects his revenue, not in money as is done in Government villages, but in kind. The Zemindar is supposed to receive one-half of the outturn of the crop, and the cultivator is supposed to receive the other; but he rarely gets more than a quarter, the other quarter generally going to the subordinate Zemindari officials. What remains to the cultivator, after paying everything, is hardly sufficient to keep him and his family in food till the next harvest; so that it is a case of living from hand to mouth. If the crops fail for one year, for want of water or other causes, most of the cultivators are left absolutely destitute, and not only the cultivators and their families, but also the coolies, who though not actually cultivating themselves, earn their livelihood by working for those that do. The cultivator when his crops fail has to use his seed that he had put by for sowing, as food: when this is exhausted he sells his bullocks, &c., and having spent the money received from these, he is without any resources. He is unable to raise money on his fields from the Sowcar, as he has no rights of occupancy; therefore his last hope is to get an advance from the Zemindar, failing this he leaves his village and seeks work as a cooly elsewhere. This is what happened last year. In November we had excellent rains, but owing to the exhaustion of the cultivators the fields remained unploughed. The Zemindar gave no advances, or to such a small extent, that they were useless. Many ryots had already left their villages, and others were preparing to do so; roofless houses were seen in all directions, and some small villages were entirely deserted.

"It was at this time (4th December), when the ryot had given up almost all hopes, that we commenced the distribution of the Mansion House Fund in this division for cattle and seed. Ten days after there was visible improvement; those ryots who had remained in their villages and could get cattle, ploughed their lands, in anticipation of receiving money for seed, and they were not disappointed. Ryots, who had left their villages returned and receiving money cultivated their lands, and by January two-fifths of the land under cultivation was sown with seed purchased with Mansion House Fund money. The area would have been greater if we had been able to distribute the money quicker; however, those ryots who received their money too late to sow paddy as soon as the harvest was in, bought seed, and sowed their land with raggi, which, luckily for them, gave a good outturn. At the commencement of the season it seemed probable that the Zemindar would not receive more than one quarter of his usual revenue, but thanks to the aid that the Mansion House Fund gave to his ryots, he has, I believe, collected as much or nearly as much as he usually receives. Most of the cultivators use the money for what it was given, but in some cases we were imposed on.

"Money was, I fear, extorted in many cases from the ryots by the Moonsiffs; I have prosecuted six and obtained three convictions. But it is exceedingly difficult to get the ryots to give evidence against the Moonsiffs, &c., as they (the ryots) are totally in their power, and if the case was not proved, the Moonsiff would certainly compass their ruin, hence their reluctance to complain.

"Rupees 3,987 were distributed to people for building houses. A larger amount would have been allotted to this kind of relief but it was found that

" the people did not use it for what it was given, and so we stopped giving money for houses. Rupees 1,922-3-7 worth of cloth has been distributed to poor people. This sort of relief has been found very satisfactory; many of the people clothed being without clothes at all and living in the jungles. Thanks to the help of the Government relief inspectors we have been able to get at the worst cases. Rupees 210-15 was given in miscellaneous relief and support of life. The smallness of this sum perhaps requires some explanation. On the formation of this committee, which consists of six native gentlemen and myself, the question was raised about Gosha females and the money doles; and it was decided that, as there were no Gosha females in this Division and as the Vice-President and myself were the only members, who were able to go on circuit visiting the villages, the other members having their business to attend to, no monthly doles should be given, but that such cases as the vice-president and myself found, should be relieved on the spot. In most of the cases we found the nature of the relief would come under the Government relief rules, and so there was no necessity for relieving from the fund money; hence the smallness of the sum given to support of life.

" Rupees 2,505 was given to weavers, there being a large number in the villages round here reduced to starvation through the famine. This has been a very satisfactory form of relief, and many looms have been set to work, and enabled the owners to provide food for their families; no less than 300 to 400 families

" have been relieved in this way, and put in the way of earning their own livelihood.

" I have to thank Chongelroya Chetty and Chongely Chetty for searching out and aiding me in this kind of relief, at no little inconvenience to themselves. I have also to thank A. Kristina Row, Vice-President and Deputy Tahsildar of the Division, for the help he has given me in distributing the money to the people, and Jaganayokulu Naidu, for interpreting between me and the other members, and translating papers, and I have to thank all for their co-operation and advice in committee. The famine, though not over in this division, is confined to the cooly class. Thanks to the Mansion House Fund, the cultivators and weavers are well provided for. The cooly class are suffering owing to dulness in the labour market; cultivators preferring to do all their work themselves, and consequently prices being higher, the coolies and poor class of people have to revert to Government relief works or camps. This state of things will continue till next harvest, which, if we have rain, will be the end of August, but if we don't, will not be till next February.—Mr. Cotton.

(3) MYSORE OFFICIAL RELIEF.

" Extract from diary of Mr. VENKET ROW, Special Relief Officer, Kolar District.

" Monday, January 7.—Visited (3 miles) Ellavacoppally P. Census work occupied me from 7 a.m. to 3 p.m. During which relief was given to 4 families. Rs. 90 were distributed among them as follows.—

House No.	Rs.	Name.	Purpose
2	25	Akki, with a brother and two daughters. Her condition was enough to touch even the hardest heart. Pays Rs. 12 Kandayam, had 2 bullocks and 2 cows last year	For a pair of bullocks.
3	15	Mooneeka, with two grown-up sons and 2 pairs of bullocks and 30 sheep last year, has 1 bullock. No house	For one bullock and to build a hut.
6	30	Baswa, with two brothers, a sister and mother, all were in the Srinwaspoor Relief Camp. Had a pair of good bullocks, 4 she-buffaloes, 15 sheep Pays Rs. 7 Kandayam. His land is not cultivated; has no house	Rs. 5 for hut. Rs. 5 for food. Rs. 20 for a pair of bullocks.
8	20	Hanama, by caste Vaddar, a son and two miserable daughters lately returned from Relief Camps, now lives by begging. Has no house	Rs. 5 for hut. Rs. 5 for food. Rs. 10 for a pair of buffaloes

" The relief afforded to the two last cases was an incalculable blessing to them, for they never even dreamt that, in their present desperate condition, to which they had been inured for eighteen months past, a relief of this kind, enabling them to settle once more in life with their relations, would come to them so unexpectedly.

" Returned home at 4 p.m.

" Wednesday, January 9. — Visited two villages, Sannaandhalli and Gungannhalli. Rs 205 were distributed among 17 families in both the villages, as follows:—

House No.	Rs.	Name.	Purpose.
4	25	Vengti, with a grown-up son and two children, her husband died of starvation. Pays Rs. 8 Kandayam	Rs. 25 for a pair of bullocks
6	10	Vengatrama, has one bullock. Pays Rs. 8 Kandayam	Rs. 10 for a bullock.
10	5	Timmi and her daughter	Rs. 2 to patch up hut. Rs. 3 for food.
12	20	Mooniga, his mother and wife. Pays Rs. 7 Kandayam, has become a day labourer, his land is waste	Rs. 20 for a pair of bullocks
13	13	Vauketama, has one bullock. Pays Rs. 7 Kandayam	Rs. 10 for a bullock. Rs. 3 to patch up hut.
15	10	Mooniga, has one bullock	Rs. 10 for a bullock.
20	5	Naga, weaver, and three dependents, has a loom	Rs. 5 for materials.
20	35	Venketramu, and nine members, all in miserable condition, has 20 acres of dry land and no bullocks, had a pair of bullocks and three cows last year	Rs. 25 for bullocks. Rs. 10 for food.
22	10	Lutchmi and three others	Rs. 10 for a bullock or a cow.
29	10	Dassa and four others. Pays Rs. 5 Kandayam, has one bullock.	Rs. 10 for a bullock.
33	5	Moonehanooma, and three others	Rs. 5 for clothing.
33	10	Louna, weaver low caste, has no loom	Rs. 5 for loom. Rs. 5 for materials.
11	7	Byah, has no house	Rs. 5 for house Rs. 2 for clothing.
30	4	Moonigah, weaver, has a loom	Rs. 4 for materials.

(e). General Results of the Distribution.

It will, I fear, be several months before I am able to prepare the final report of the committee.¹ Meanwhile, as a guide to the Famine Commission in estimating the

direction and extent of the relief afforded, the following details are given, errors and omissions excepted. They will need careful testing and revision before they are submitted to the public and to subscribers, but, for the purposes of the commission, may be taken to fairly represent the mode in which the 81 lakhs have been

¹ Some district committees are still working.

expended. The details err in under-statement rather than in exaggeration. They are, roughly as follows—

	Nos. relieved.	Amount expended.
1. Support of life, food, money doles, &c. -	3,033,169	Rs. 25,07,665
2. Orphanages -	231,740	4,63,408
3. Day nurseries -	5,108,803	7,59,402
4. Clothing -	864,079	8,72,191
5. Providing or repairing houses -	132,035	6,80,012
6. To cultivators for seed, bullocks, &c. -	425,931	17,07,154
7. Miscellaneous charity -	203,978	2 32,290
Total -	9,999,735	Rs 72,22,182

These returns, as I have said, are incomplete. For instance, some of the committees returned the same persons over and over again in their reports, in this wise. Supposing, under heading 1, a man or woman, who, from caste or other reasons, did not receive Government relief, and obtained a dole from one of our committees, of, say, eight annas per week, were given for six, nine, or twelve weeks, that individual would be counted so many times over. It will, perhaps, be impossible to obtain accurately (1) the number of persons relieved as distinct from (2) the number of times an individual was relieved. In some of the Mofussil districts the people on relief changed frequently. An attempt to distinguish the points mentioned will be made before the final report of the executive committee is issued. The remarks regarding item 1 also applies to item 3. In respect to day nurseries the totals returned will be very largely reduced, showing perhaps only one-sixth of the number set down in the returns received. As regards the other items the figures may be taken as exact for the sum totalled which, it will be seen, is nine lakhs short of the whole amount received. It will be noted that nearly one-third of the sum received was expended on support of life, and, as particular care was taken in discriminating as to the need of recipients, this sum may be held to represent a portion of the distress which could not be reached by Government according to the principles which guided State relief. The same remark also applies to the persons relieved under the head "Miscellaneous," whereby many weavers and others were helped. Nearly a million and a half of people received *substantial* assistance, in the way of rebuilding houses, obtaining seed, bullocks, &c., and clothing. Item 6 does not show all the persons benefited, as in many cases money was given for the hiring of bullocks, and one pair was used for many fields in the occupancy of different ryots. As is stated in Mr. Cotton's report (see *ante*, pp. 15-16), nearly two-fifths of the whole cultivation in Kalastri Zemindari were from relief money, and without it this land could not possibly have been cultivated, as all credit with money-lenders was gone.

III.—MAY PRIVATE CHARITY PLAY ANY PART IN FUTURE FAMINES?

I now leave the region of facts and come to the expression of opinion as to the part (if any) which private charity may play in future famines. I am inclined to think that, though the necessity for the exercise of private charity will be as abundantly necessary as ever, apart perhaps for support of life, the chances of its being availed of are very slight. This state of things (to my mind) is partly brought about by the ruling of his Excellency the Viceroy in Council on December, 21, 1877, a ruling which has been sanctioned by the Secretary of State in Despatch No. 46, dated 10th May, 1878. The remarks of his Excellency and Lord Salisbury on this point will be quoted presently. Meanwhile I must ask the indulgence of the Famine Commissioners if I may seem to be somewhat lengthy in the expression of my opinion on this point. I feel it is necessary, as I recognize most momentous consequences flowing from the Despatch in question, that I should set out at length the circumstances which seem to me to point to but one conclusion, and that conclusion the stifling henceforth of private charity in an Indian famine campaign.

Private charity, as understood and practised in Madras, nowhere comes in conflict with Government efforts to combat distress. Its line is perfectly distinct, and its object is to step in where the authorities, dealing with State funds, could not properly do anything. In the most carefully managed famine campaign conceivable there must be scope for an agency working outside of Government operations, and yet in perfect sympathy

and accord with Government. I suppose it is hardly likely that, in the future, famines will be more skilfully managed than were (1) the Bombay famine, throughout its whole course, and (2) the Mysore famine, from September 1877 onwards. Yet, in both these cases, opportunity was found for the most beneficial exercise of private charity. In Bombay, the Deccan and Khandeish Relief Committee—head quarters in Bombay, branches in twenty-four places in the Presidency—and the Poona Sarvajanik Sabha, and, in some cases, Government officers, were able to do very much towards restoring the country to a prosperous condition. Of what was done in Mysore towards bringing things to a normal state Mr. Elliott has given interesting proof in his "History of the Mysore Famine," pp. 178 to 186. The effects of famine upon the agricultural population of India are so severe; ryots are so completely denuded of all they possess as householders and cultivators before they are allowed to receive Government relief; that, if they are ever to regain their former positions and not remain as a permanent burden upon the State, increasing the already too-numerous crowds of beggars, they must be assisted. This assistance can only come from private charity. Although the appeal for outside aid in 1877 was slightly misapprehended by the people of England, many of whom supposed they were contributing solely for support of life in persons who must otherwise perish, no blame for this opinion being largely prevalent can attach to those who made that appeal. At the preliminary meetings held in the rooms of the Madras Municipality it was distinctly stated, again and again, the object in view was to assist Indian cultivators with seed grain, implements, &c., in the same manner (as was then stated) as the people of Northern France were assisted during the Franco-German war. Further, his Grace the Governor of Madras, as chairman of the public meeting held at Madras on August 4, 1877, whence the appeal was telegraphed to London, said.—"As he had said before, it was the duty of the Government to see to the supply of food, but public charity was needed for other purposes. It was not food alone that was needed. During the short trips he had taken in the famine districts—he was sorry that he could not make such more frequently or farther,—His Grace had noticed the want of covering for the body, the roofless houses and the destitute condition of the poor who were compelled to seek relief in the camps. Thatch had been taken from the roof for the cattle, and the bamboo rafters converted into means to purchase food. The sights to be met with presented a sad picture of the destitute plight to which a very large number of the people had been reduced. Consequently, too many, when they return to their homes from the Relief Camps or public works, will have to go to a roofless house with not a single culinary vessel remaining in it. Here were wants which it would be necessary to recognise and supply, and for which he thought outside aid might well be sought. To provide clothing for the poor, even such scanty clothing as this climate necessitates, means were wanting; to enable them to repair their houses and to purchase new implements instead of those which they had sold in order to procure the means to

1 Sir Richard Temple's opinion clearly was that relief works had been opened too soon, that the coolies were receiving too high a wage, and that consequently large numbers were attracted to the works who were not yet in such a state of destitution as to be fitting objects of State relief. "If," said Sir Richard, "I were in England, and a man wearing a good black coat and silk necktie were to come up to me and tell me he was starving, I should not believe him, but should say, 'My friend, were you really starving you would have sold your good coat and necktie, and bought food with the proceeds, come back to me when you have done so, and then I will give you relief.' Such is the policy I would pursue in India. You have begun too soon. If you question this man you will find that he has at home a bullock, or perhaps two; yonder man has a couple of acres of land, if this man were really starving his blanket would be in rags, and yonder woman would have sold the glass beads she is wearing round her neck. Again, look at these six men I have picked out of your gang, they are fine tall men. Look at their broad shoulders and sinewy arms, and contrast them with these others who are thin and emaciated. Do you mean to tell me that in a gang of famine coolies there should be so wide a difference? These poor wretches have clearly nothing, but the others are probably men of some substance, who supplement their famine wages by the little property they still possess. In a famine so huge as this is the State cannot do more than keep alive. What you have to do is to muster each of your gangs as I have done this, you should, as it were, weigh each man on your finger, as a native cashier (shroff) does the coin which is paid into the treasury, and to those who seem to you to be not yet fit objects of relief, you should say, 'Go home, my friend, and come back to me in three weeks or a month, when you have eaten the proceeds of your plough, your plough, and your ploughing cattle.' But, Sir, has your Sir Richard inspected in this manner upwards of a hundred thousand relief coolies in the presence of the European, and Native subordinate officials of his ranks, and it is therefore easy to be understood that his policy was soon widely known.—A pamphlet towards the History of the Madras Famine, by a Madras Christian, pp. 15-17. London, W. Ridgway, 160, Piccadilly, W. 1877.

" obtain food, would require funds, which might be
 " looked for from public charity. It was necessary
 " that the public charity should be invited for these
 " purposes, and such wants were eminently suited to
 " the claims of charity. To supply these wants to so
 " large a number of people would need a sum of money
 " far more than could be got from the Presidency. It
 " would be necessary to look for aid to the sympathy
 " which England had exercised on occasions of distress
 " through many by-gone years. His Grace was con-
 " vinced that they had but to place a true account of
 " the distress prevailing among the people of this land
 " to evoke the sympathy and secure the liberal aid of
 " England. He could not think that, when it should
 " be known in England how a large portion of the
 " Presidency was subject to calamity and distress,
 " when it should be known that the district in which
 " the distress prevailed included eighteen millions of
 " people, and also when it should be known that two-
 " thirds of the Presidency was suffering from high
 " prices of food, that whole districts were suffering
 " under pressure of prices double what had been
 " suffered in the Bengal Famine of 1874, the people of
 " England would not hesitate to admit the need for
 " aid." Much misapprehension has prevailed regard-
 " ing the terms on which this appeal was made so that it
 " may prove to be well that I have quoted the exact words
 " of an address which was very widely circulated at the
 " time. Notwithstanding that the committee put prac-
 " tical assistance of the kind specified in the forefront, it
 " will be seen from the details of expenditure already
 " given that a vast amount of suffering from actual want
 " of food had to be faced. As it was in 1877 so it will be
 " again in this respect, though perhaps to a diminished
 " degree.

In passing, it may be pointed out that the experience
 afforded by the many committees which have been in
 active operation, in some cases for many months, in
 Southern India during the famine, should furnish some
 evidence towards answering the question which was
 considered by the Members of the Famine Commission
 at Simla, and others, *viz.*, whether there exists *personnel*
 for use in developing a system of local responsibility
 for the administration of charity both in normal and
 abnormal times. As soon as the funds were provided
 it was found practicable to organise committees of
 gentlemen of all races and creeds who were willing to
 devote much time and trouble to the proper distribution
 of charity. In Madras city, of course, the means were
 found in largest measure, but nowhere in the Presi-
 dency,—so well provided is Madras with Missionaries
 and others,—did there lack at least one trustworthy
 gentleman who could become the focus for effort, and
 who was able to direct the action of Natives who were
 willing to work under such direction. So far as indi-
 viduals are wanted for working a scheme of Local
 Relief I think facts which are now on record in the
proceedings of the Relief Fund bear out the hopeful-
 ness expressed in some of the papers of the Simla
 Symposium, *viz.*, that if a practicable scheme could be
 formulated for local relief it would not fail for want of
 persons willing to give their services for the good of
 the community.

It is well known that the appeal to England in 1877
 was made not only without the consent of the Govern-
 ment of India, but—until the principles of relief were
 formulated—against its wish and contrary to its desire.
 That appeal originated entirely among non-officials,
 and only when arrangements for a public meeting had
 been made was a request conveyed to his Grace the
 Duke of Buckingham and Chandos, Governor of Madras,
 to preside over the meeting. This his Grace kindly
 consented to do, in his private capacity as a citizen.
 Differences of opinion between the Government of
 India and the Government of Madras occurred, which
 ceased with the correspondence issued from the
 Governor-General's Camp on the 30th of August 1877.
 As a non-official I think I may be permitted to
 remark that it seemed as if the Government of India
 imagined that the appeal which proceeded from Madras
 should have first received its sanction. In what was
 done there was no thought or intention of ignoring
 the Government of India and certainly no desire to act
 in defiance of its wishes. But the gentlemen who
 exerted themselves to get up the public meeting, and
 to direct and inform public opinion had no *locus standi*
 whereby they could approach the Government of India
 as a Government or even the Local Government.
 Further, had they, through the usual official channels,
 addressed the Government of India, then at Simla,
 much time would have been lost, the interest and

enthusiasm which was endeavouring to evoke the
 sympathy of England—(and without enthusiasm on the
 part of individuals no movement of the kind could be
 initiated)—would have evaporated, a month probably
 would have been consumed, the rains which fall in
 September would have (apparently) robbed the appeal
 of much of its force,—though it would not really have
 done so as crops are not sown, grown, and ripe for the
 sickle all at once because rain has fallen,—and the
 consequence would have been that the movement
 would have collapsed. In December 1877, the Governor-
 General in Council, writing to the Secretary of State
 said —

" None the less, we think it necessary to state ex-
 " plicitly our view that, should it ever be again deemed
 " desirable to appeal to the English public for sub-
 " scriptions, in aid of famine-relief, such appeal
 " should not be made, save with the assent of the
 " Government of India, and after the Viceroy in
 " Council has had an opportunity of laying down,
 " distinctly, the purposes to which subscriptions should
 " be devoted. In the present instance, the result has
 " not, so far as we can judge, been unsatisfactory,
 " solely because there was a determination on both
 " sides to avoid friction, and to meet each other half-
 " way,—the Government lent the services of their
 " officers, and the Committee took pains not to inter-
 " fere with the action of the Government; but, if the
 " Committee had chosen to work on the same lines as
 " Government had already occupied, the organization
 " was such that no official control could have been
 " exercised, and great friction and confusion would
 " inevitably have been caused. When Government
 " undertakes such an enormous task as the preserva-
 " tion of life, so far as possible, in a country stricken,
 " as Southern India was, with the full intensity of a
 " terrible famine; the Government, and the Govern-
 " ment alone, should in the last resort have the
 " direction of whatever volunteer agency may be
 " organised, and should exercise some control over
 " the expenditure of such sums as the liberality of the
 " nation may contribute. The Government would, as
 " a matter of course, avail themselves to the fullest
 " possible extent of the assistance of central and local
 " committees; indeed, the existence of such com-
 " mittees would be necessary in the first instance
 " probably to evoke the liberality of the nation, as it
 " is not likely that people would be willing to subscribe
 " largely to a direct and ostensible contribution to
 " the revenues of Government. But by formulating
 " in the first instance the objects for which subscrip-
 " tions are invited, and the agency through which
 " they are to be expended, two advantages would be
 " gained—(1) people in England would know definitely
 " how their subscriptions were to be applied, and (2)
 " committees would have no choice but to apply the
 " funds to objects, and in a manner approved before-
 " hand by Government. With the action of unofficial
 " persons in inviting subscriptions the Government
 " cannot, of course, interfere. Such invitations, un-
 " supported by the authority of Government, would
 " probably meet with but little response; but we are
 " decidedly of opinion that a general rule should be
 " laid down directing that, in cases of future famine,
 " the head of the Local Government should not,
 " whether in his private or official capacity, appeal to
 " the liberality of the English public without first
 " receiving the approval of the Supreme Government,
 " not only in regard to the appeal being made, but also
 " in regard to the purposes to which the money, so
 " contributed, is to be devoted, and to the agency to
 " be employed in distributing it."

The Marquis of Salisbury, in acknowledging this
 despatch replied (No. 46, Revenue, dated India Office,
 London, the 16th May 1878):—

" With reference to the 2nd paragraph of my
 " Despatch, No. 18, dated 21st February, I have now
 " to take under consideration the proposals made in
 " the concluding paragraph of your letter, dated 21st
 " December, regarding the proceedings proper to be
 " taken in respect of appeals for charitable contribu-
 " tions towards famine relief.

" You are of opinion that, in cases of future famine,
 " no appeal should be made by a Local Government to
 " the charity of an English public, excepting with
 " the approval of the Governor-General in Council;
 " that the Governor-General in Council should, in the
 " first instance, define the objects to which (as distinct
 " from the obligation devolving on the Government)
 " such charity will be devoted; and that, to inspire
 " confidence in the public, as well as to secure the

" efficient administration of the funds, local committees should conduct their operations under the control of Government and with the co-operation of its officers

" I entirely concur in the soundness of these principles.

" Your Excellency in Council has made these proposals in reference only to appeals preferred to the English public. Their adoption in such cases will not, however, preclude appeals being made to the Indian public by Local Governments, or for lesser objects, within more limited areas, by high officials. Amongst the wealthier classes of India there is an ample fund of benevolence, which may well be drawn upon (as, indeed, it has on previous occasions) by judicious appeal from the local authorities. Much judgment is, no doubt, needed as to the mode in which such contributions should be invited, in order that the action of the public may be entirely voluntary, and without even the appearance of constraint. But the well-known disposition of the people to succour the distressed leaves no room to doubt that aid would be cheerfully rendered upon all occasions of urgent necessity."

The objection to this course, it seems to me (judging from my experience in connection with the Fund of 1877, and as a non-official member of the community) is that *no appeal will henceforth be made, should a famine unfortunately again occur*. I come to this conclusion, from the fact that at no period during the late distress did either the Government of India, the Government of Madras, the Government of Bombay, or the Chief Commissioner of Mysore show any intention or readiness to make an appeal for aid. No appeal would, I think I may safely say, have been made by either the superior or subordinate Governments. My reason for making this remark is that the Bombay Government never recognised the necessity for affording aid to the suffering people in that Presidency from the Indian Relief Fund, and all the help which was afforded to them was through non-official bodies such as the Deccan and Khandeish committee and the Sarvajauk Sabha. Indeed, it is not possible that a Government as Government could make such an appeal as was made, though they might be satisfied that the need for special assistance existed.¹ Though the Governments refrained from doing anything in this direction the need for something being done was apparent and the good achieved forms a sufficient *raison d'être* for the action that was taken in 1877. This the Government of India generously and cordially admits.

I would venture to hope that the two Despatches which I have quoted above will be permitted to become a dead-letter. "The action of non-official persons," the Viceroy says in his Despatch, "unsupported by the authority of Government would probably meet with but little response." Perhaps, the less the "authority of the Government" is seen in a matter of this kind the better, except in a general form, as was the case in 1877. The gentlemen who were responsible for the inception of that movement were certainly in active sympathy with the local Government, but neither at the outset nor at any later stage in the proceedings did they act under "the authority of Government." The fact that they were able thus to labour, independ-

ently as it were and yet in closest harmony with the authorities, enhanced the value of the gifts to the suffering people to an untold extent. It is generally conceded that the political benefit which has resulted from the assistance rendered by the fellow-subjects of Her Majesty's Indian people in all parts of the British dominions has been very great. Much of this good depended upon the fact that the appeal was not official but non-official. The money received also was dispensed at the minimum of cost. The whole charges of the Fund of 1877-78 in the central and sub-committees (one hundred and twenty in number) will not come to one per cent. on the amount disbursed. If, in future, Government officials are to be the medium of distribution a portion of their salaries ought properly to be debited to the cost of distribution. I do not suppose that non-officials will be anxious to give their services gratuitously to work a Government Fund, even if it be possible to raise one, which, for the reasons already given, I think is improbable.

The (very natural and proper) object of the State in dealing with famine is to minimise and keep down the distress as much as possible, and to discourage the habit of the people of looking to the Government for anything more than bare subsistence or employment. To encourage the people to expect more from Government would be to demoralise them to the most extreme extent. What the authorities could not do in this respect, fellow-subjects of the sufferers could well do, and, as has been demonstrated in the most convincing manner during the past two years, have done.

For these, then, among other reasons, I would venture to hope that the Famine Commission, in reporting upon the scope which exists for private charity, will consider whether greater good is not likely to be done by leaving the question, by whom the appeal should be made, entirely an open one. The good sense of the community and the necessity for being in accord with the Government, would, I am convinced, in the future as in the past, ensure the appeal being made at the proper stage of affairs. If the right of appeal, with the hearty concurrence of the authorities, is not to be left to the community at large, then, it seems to me, no appeal at all can be made, and many thousands of respectable, though unfortunate, people, who might otherwise be helped to regain their position in life, will remain permanently ruined and degraded. Many others, too, beyond the scope of Government relief, will certainly die of want.

It is agreed, on all hands, the Government of India, with warm and generous words leading the way, that great good has been done as the result of the appeal to England in 1877. Now that there is formulated experience to guide the administration of private funds, on a future occasion more speedy and complete results may be confidently counted upon. But, if private charity is to become solely a branch of Government relief the stream will be small and feeble, and the good accomplished very slight. If the Government of India will, in this matter, treat the non-official community with the freedom and liberality which the Executive committee in Madras exhibited towards its local committees the result, in my humble opinion, cannot fail to be as good in the one case as the other. The sole object which all who took part in the private relief distribution had in view was to assist the Government and to benefit those in need to the utmost of their power, and, being generously trusted and almost entirely uncontrolled, they greatly succeeded, the Government of India itself being witness.

WM. DIGBY.

22nd January 1879.

* "The task of giving relief to all those who suffer offers the noblest opportunity of doing good to well-applied private charity and intelligence and zeal; but it cannot be undertaken by the State"—*See John Strachey, K.C.S.I., Financial Statement, 1877-78.*

VII.—NOTES ON INDIAN LAND REVENUE.

MINUTE BY SIR LOUIS MALLET.

THERE are some points in these papers which I cannot leave without comment.

It will, no doubt, be desirable, before deciding on the course to be taken with regard to the present reference, to await the opinion of the Government of India, but incidental questions are raised in the correspondence, which are full of significance.

I refer to the apparent absence of any kind of common understanding or agreement between the local authorities (and I wish I could believe that it was confined to the local authorities) as to the relation of the Government to the occupiers of the soil.

Mr Robinson, in his Minute of 9th September 1873, refers to the controversies at the beginning of the century as to the nature and intention of the "ryotwari" settlements, and evidently inclines to the opinion that they were meant to be *limited and permanent*.¹

He speaks of the reaction which has since set in, and of the disposition in Madras to increase steadily the "ratio of demand upon the land."

He very wisely deprecates the disturbance in the market value of the whole landed property of a vast peasant proprietary by the operations of the Settlement Department, which, with more propriety, might be called the Unsettlement Department.

He concludes by expressing a fear that the course now being taken may be "seriously reducing the actual value of all landed property in the country, and shaking its credit in an investment."

Mr Sim accepts, if he does not approve, the principle deliberately asserted by the Home Government, viz., the re-assessment of the land every thirty years, on the basis of a moiety of its net produce, commuted into money, at an average of the prices ruling during a certain number of antecedent years; but he has apparently altogether forgotten the grounds upon which this principle was formulated, in an elaborate despatch from the Court of Directors, of the 17th December 1856, viz., that the "right of the Government is not a rent" which consists of all the surplus produce, after paying "the cost of cultivation, and the profits of agricultural stocks, but a *land revenue only*, which ought if possible, to be so lightly assessed as to leave a surplus "or *rent* to the occupier, whether he, in fact, let the land to others or retain it in his own hands"—for, he goes on to speak of the Government as virtually the "great landlord," and the advantages of a "sound settlement of the demands upon the land, of which they are, *in fact*, proprietors."

The Governor points out in a pithy sentence, "that, under explicit instructions from home, a costly machinery is maintained on the basis of half *net profits*" (I hope he means *produce*), "but, that practically, the rate of assessment is decided on much simpler considerations, the main one being that the cultivator "should pay no more than he paid before," with, if any at all, a small additional per-centage.

So much for the local authorities, and I think what I have said is enough to show the confusion of thought, looseness of expression, and uncertainty in action, which prevails in Madras in a matter which lies at the very root of all agricultural prosperity.

It would require far more research than I can undertake for the present purpose to view the inconsistencies of the authorities at home, but I will refer to a few instances.

Lord Cornwallis's permanent settlement proceeded on the principle that the State was the proprietor of the soil. In that capacity it renounced its rights to a progressive share in the rental of the land. But it was the *rent* which was renounced, it was not *revenue*, and yet to this day we are told that the land of Bengal is to be exempted from all share in the taxation necessary for the purposes of Government to all future time.

Mr. James Mill, in his evidence before a Select Committee in 1831, speaks of the *rent* of land in India having always been considered the *property of Government*.

In a return to the House of Commons in 1857, on Indian Land Tenures, signed by Mr. John S. Mill, I find the following general statement:—

"Land throughout India is generally *private property*, "subject to the payment of revenue, the mode and "system of assessment differing materially in various "parts."

On the occasion to which I have already referred, viz., the correspondence with Madras in 1856, the Court of Directors emphatically repudiated the doctrine of State proprietorship, and affirmed the principle that the assessment was revenue and not rent; the revenue being levied upon rent, as the most convenient and customary way of raising the necessary taxation, which in a self-contained country, possessed of vast undeveloped agricultural resources, is perhaps the soundest, simplest, and justest of all fiscal systems.

Sir C. Wood in 1864, reaffirmed this principle, but went beyond the Court, by fixing the rate of assessment at 50 per cent. of the net produce, fully recognizing, however, that this was merely a general rule, and that in practice the greatest possible latitude must be given.

The principle thus established appears to rest, then, upon a solid scientific ground; but launched, as it necessarily was, in language and under circumstances which really almost reduced it to an abstract proposition (for the application of the principle was entirely left to the judgment of the Settlement Officers, and the tasks given them altogether beyond the power of any human beings to discharge, except in the roughest manner), one cannot wonder that the whole administration has drifted into the chaos in which these papers show it now to be.

One is tempted to ask if rent—economic rent, pure and simple—is alone to be taxed, why, instead of the costly, cumbrous, capricious, and when all is said, most intellectual settlement system, we cannot leave the assessments to take care of themselves, and take whatever percentage on the rental of the land we want, wherever we find it. I can only suppose that the answer would be, that in truth the 50 per cent. of the net produce has been a mere paper instruction, a fiction which has had very little to do with the actual facts of the administration, and that in practice the rates levied have often absorbed the whole rental, and not unfrequently, I suspect, encroached on profits also.

But to return to my narrative of inconsistencies on the part of the Home Government.

I have referred to the instructions of 1854 and 1864, as regards Madras. In the year 1861, proposals were made by the Government of India for the redemption of the land revenue. These were not entertained, but I mention them as showing that here again that Government at all events proceeded on the theory of *rent* and not *revenue*, and in the policy put forward, although still in abeyance, by the Home Government so late as 1865,¹ the general principle of which appears to be that a permanent settlement, after revision, might be made on estates in which the actual cultivation amounts to 80 per cent. of the cultivable area. This is a return to the order of ideas which prevailed in Lord Cornwallis's day.

I do not wish, on this occasion, to discuss the question of principles which lies at the root of this controversy, because I am well aware that it is one which every one connected with the Government of India regards with extreme aversion, and also because it is quite unnecessary for me to state my absolute disbelief in the success of any experiment of Government on a large scale, founded on

¹ Even the exact meaning of these terms is full of doubt.

¹ See Revenue Despatch, No. 11, of 24th March 1865.

communitistic principles. That even worse results than those which are apparent, have not followed the partial assumption of the function of proprietor by the State in India is, I suspect, owing to the constant compromises which have been made, and the alternating influence of the counter current of opinion and policy in favour of private rights.

But in anticipation of the comments which will, I know, be made by those Members of Council who take the trouble to read these remarks, I would invite their attention to a few practical considerations.

If general principles, as I am constantly told, are inapplicable to India, on what method are we to proceed in government? If the deductive method be discarded altogether, surely we have a right to ask for some careful and active process of induction. Yet, if there is any one thing which is wanting in any investigation of Indian problems, it is an approach to trustworthy and generally accepted facts. There is hardly a subject upon which the best authorities do not absolutely disagree as to the fundamental facts. I could mention the most startling instances, but they must be present to the minds of all of us. Now I am compelled to say that, since I have been connected with the India Office, I have found just as strong a repugnance to the adoption of any adequate measures for the collection of a comprehensive and well digested set of facts as to the recognition of general principles. The only occasion upon which I had the misfortune of encountering the vehement opposition of some Members of Council, for whose opinions and experience I have the most unfeigned respect, was in my advocacy of Dr. Forbes Watson's proposals for an Industrial Survey.

Again, if general principles are to be set aside, why are they so perpetually invoked in public documents, reports, and manifestoes? It may suit the shifting purposes of the hour to play fast and loose with principles, but is it safe, in dealing with a "quick-witted and logical" people, to rely upon their inattention or forgetfulness?

If it is argued that it is of no practical use to arrive at, and act upon, a definite principle in this matter of land revenue, and that, so long as we obtain our money, it is idle to dispute as to the terms employed in raising it,—I answer that this indifference to accurate thought and expression has been, and is, a source of the greatest possible difficulty. I will take, as an instance, the Permanent Settlement in Bengal. Is it not notorious that the absence of any careful distinction between rent and revenue has led to the claim, still held by many of our highest authorities to be incontestable, to an immunity from all new taxation on the part of landholders? The solution of this difficulty is becoming every year a question of greater political importance, and may become a source of much political danger.

The close connection between the system of land tenure prevailing in a country, and the condition of its population, will, I imagine, be generally admitted. In India, where agriculture is the principal, and indeed the only, industry on a scale large enough to make it a national characteristic, it seems to me that the conditions on which the land is held must be an object of primary and paramount importance.

Whatever opinions may be held as to the principles of land tenure, certain facts, are, I think apparent.

On the one hand, we see a system which sweeps into the coffers of the State 50 per cent. or more of the net produce of the soil, thus diverting a fund which, in

countries where private property is absolute, would, to a great extent, find its way back again into channels of agricultural improvement.

But the amount of produce thus diverted is not only large—it is also uncertain. The percentage itself is uncertain, varying with the views of successive governments, and the amount actually assessed, even within the prescribed limits, is uncertain, varying with the accidents of seasons, with the character of the cultivators, and with the judgment and knowledge of the Settlement service.

Whether the Government or the assessor leans to the side of indulgence or to that of severity, all the consequences of uncertainty are equally involved. What those consequences are likely to be it is needless to enumerate. It is enough to say that security and permanence are the essential conditions of productive energy.

This system, moreover, is one in which proprietary rights are so confounded, or so confusedly divided, that they are separated from their corresponding duties, and such is the dislocation of the forces engaged in this artificial mechanism, that these rights as often serve to maintain and perpetuate inefficiency as to rouse and stimulate industry and the spirit of improvement.

Such are a few of the salient features of the system. What, on the other hand, do we find as the characteristics of the industry and of the people to which that system has been applied?

A marked absence of any adequate accumulation of capital upon the soil, and (as a consequence) of any sufficient appropriation of such capital to purposes of agricultural improvement, deficiency of stocks, of manures, of roads, of tanks, often of seeds and of implements.

For the people, prevalent habits among the higher classes of prodigality and indolence, and among the lower, a character of helpless dependence on Government, extreme poverty, and, generally, very low conditions of existence. Nowhere do we see a spirit of enterprise, of initiation, or of progress.

I do not think that this is an overstatement of the impression conveyed to the mind of an outside observer like myself by a study of the accounts which reach us from different parts of India; and when it is remembered that the state of things, which I have very briefly described, is precisely that which the science and experience of modern societies would have predicted as the inevitable result of the economic conditions which have prevailed, I think it must be allowed that, if there be no relation of cause and effect between them, it is at least a strange coincidence that they should be found side by side.

I have confined my remarks to the economical and social aspects of this question, but I am not sure that, from a political point of view, it is not even more important.

By a perpetual interference with the operation of laws which our own rule in India has set in motion, and which, I venture to think, are essential to success—by a constant habit of palliating symptoms, instead of grappling with disease—may we not be leaving to those who come after a task so aggravated by our neglect or timidity, that what is difficult for us may be impossible for them?

L. M.

3rd February 1875.

MINUTE BY SIR G. CAMPBELL.

I do not see that much can come of further stirring the vexed question whether the money taken by Government from the land in India, is revenue or rent. It is more a question of words than of anything else. We now take as nearly as we can *half the rent* of lands not permanently settled, and whether we call that half rent, revenue or rent, the fact is the same.

The term *net produce*, as used by the Indian revenue officers, is synonymous with rent. It is only in regard to lands where the same man is both owner and occupier that the term is used, because there is no actual rent, and under the form of net profits the attempt is made to ascertain what would be the rent if the land were rented.

I apprehend that now-a-days, in most parts of India, there is some land rented either under customary rents or competition rents sufficient to give some index to the rent rates actually prevailing. I rather fear that the Madras Settlement Department are carrying on the attempt, long ago abandoned in northern India, to

ascertain the net profit or rent, by calculating the gross produce and the expenses of cultivating, and thence deducing the net profit. I am much convinced that any attempt to do anything of the kind is quite hopeless. If there is no rent to take as an example, we must arrive at rent rates by some rule of thumb process.

However, we have not before us in these papers any details of the *modus operandi* of the Madras Settlement Department; this only is made clear, that up to this time it has been very slow and very expensive.

I am very glad that the whole question of this Madras Settlement has been broadly raised. I have long felt that it was a subject on which no one out of Madras had, or could get any definite information. The settlements have, it appears, been dragging their slow length along, without any general review of the matter.

What I understand to be principally raised again in these papers is, whether the old settlements made in Madras, by Sir T. Munro and others, are to be treated

as permanent settlements, not liable to enhancement, or whether they are liable to be revised and enhanced if there is ground for enhancing. It is argued (and no doubt argued with some reasons from that point of view), that if we cannot enhance the old rates, we need not go to all the expense and trouble of a survey and settlement. But as I understand it, this question has been decided nearly twenty years ago. It was, after much discussion decided, that the whole of the land of Madras not under a settlement formally declared permanent, should be surveyed and reassessed upon certain general principles to be laid down by the Government. The term of the new settlement is to be thirty years. In fact, this work has been going on for the last seventeen years, and a half of it has been done.

It seems to me to be quite clear that we cannot and ought not to go back—to say all that has been done is wrong; the old settlements, which have been for so long treated as liable to revision, were, in fact, permanent settlements; we will now confess our error, put an end to the settlement operations, and leave things as they were.

On the contrary, what we are, I think, bound to do, is to inquire why the settlement operations have been up to this time so dilatory and insufficient, and to issue such orders as shall insure their being more carefully and effectually carried on hereafter.

Although, as I have said, no details are before us, I gather from these papers that one cause of the difficulties hitherto experienced may have been that, in truth, the Madras authorities have carried on the work in a half-hearted sort of way, many of them clinging to the view (inconsistent with the whole process) that the old settlement was permanent, and not subject to enhancement. They will only admit that a revision to diminish severe assessments was allowable. According to the Governor, they are now supposed to be elaborately carrying out, under explicit instructions from home, a system of valuation and assessment, on the basis of half net profits, but practically the rate of assessment is decided by very different and much simpler considerations, the most important of which is that no cultivator is to pay more than he paid before, plus a very small percentage. I think it should at once be ascertained whether this really is so, and that, if so the practice should be radically altered. Unless the old settlement is openly and avowedly admitted to

be permanent, it seems to me clear that, seeing the enormous rise in price, extension of communications, and increase of prosperity, a large increase on the former rates may and should be taken in many places.

Either let us avow the principle of permanent settlement, adjust our old system of revenue accordingly, and reap such advantages as result from permanency of assessment, or let us have the benefit of a new assessment, proportioned to the increase of prices and values. Do not let us drift into a permanent settlement. And that is, I fear, what is going on in most parts of India, as well as here in Madras, with the result that we have meantime all the evils of want of permanency, without anything like the full advantage of assessments raised as the country rises.

Supposing it to be resolved to uphold the decisions which have been come to and so long acted on regarding the Madras Settlements, I think we should in strong terms insist that all the Madras authorities shall honestly and actively carry out the orders, and not hark back to argue that the old settlement should have been treated as permanent. Vigorous measures should then be taken to carry out what remains of the settlement, and to bring it to a conclusion as speedily and as effectively as possible. The upward current of prices is now such that, if the land is fairly assessed with reference to its real capabilities, we must derive from future operations an enhanced revenue, which will far more than cover the expenses of a survey and settlement properly conducted.

The papers regarding the reference made to the Government of India are not in the file—apparently applications were made to India because questions of expense were involved; but thus I certainly know, that the Government of India know absolutely nothing of Madras Settlements, and have never made any attempt to master the subject. I think it had much better be dealt with here as it has always been. I should add that, my view that the present assessment of Madras must be completed, does not prejudice the question, whether it is desirable to have a permanent settlement. After completing the present operations, we might make a permanent settlement on any terms that might be deemed proper. I only urge that we cannot now acknowledge the old settlements to be permanent.

G. CAMPBELL.

25th February 1875.

MINUTE BY SIR HENRY MONTGOMERY.

It seems to me unlikely to lead to any practical advantage to enter on the vexed question of revenue and rent. Volumes have been written on the subject during the past century, and I doubt whether the advocate of either side has been persuaded by the arguments of his opponent.

The question now for decision is, shall the survey and assessment of Madras be continued on the principles authoritatively laid down by the Court of Directors, after much discussion and careful consideration, in 1856, as the members of the Madras Council advise? or shall it be summarily stopped, in accordance with the views of the Governor, chiefly on economical grounds?

The cost of the work has undoubtedly exceeded the estimate considerably, and the time occupied has been greater than was calculated on. There are many valid reasons assigned for this. The incompleteness of the original estimate, which did not provide for charges on account of regimental and leave allowances of the officers, and other items, amounting to 11 lacs of rupees, the unhealthiness of certain parts of the country surveyed, the minuteness of the survey, and its not being in advance of the operations of the Settlement Officer, which were thereby much retarded. Then there were changes in instructions as to procedure, and threatening of abolition and starved establishments, by which only 2½ survey parties were maintained at work, where there was ample supervision for the continuous employment of five or six.

The selection of the first Director of Settlements was not felicitous. Mr. Newill, though an able revenue officer, with scientific acquirements, was unfortunately given to writing and disputation, and much time was lost during his incumbency by want of cordiality between him and his colleagues and his superiors.

Then, in Sir William Denison's administration, discussions regarding the period on which increase of prices should be calculated involved a reference to the

Secretary of State, pending which, proceedings in the settlement were almost in abeyance.

But notwithstanding deficiencies and obstructions, the work done, though short of expectation, is admitted by all competent authorities to have been carefully and well done, both of survey and settlement, and the results, as shown by the statement attached to Mr. Dalzell's Memorandum, are an increase in favour of the revised rates, compared with those previously in force, of nearly eight lacs of annual revenue, or 6½ per cent. Of late, i.e., 1870 to 1873, when, as is aptly stated, "the Department was left 'at rest,' without any change of Director, or fear of interruption," much more rapid progress has been made, and it may fairly be expected that, if the work is continued on the principles at present acted on, aided by a somewhat augmented subordinate establishment, for which there is ample existing supervision, more rapid progress will be secured, and time and cost saved.

Mr. Robinson, in analyzing the statements of work performed, estimates, "including incomplete work," that from three-fifths to two-thirds of the task on hand is fully achieved, while "every year is adding to the expedition with which work is out of hand in both departments."

To abandon work thus successfully advanced, under direct instructions issued from the Home Government of India, would appear an unpardonable and impolitic act of retrogression, for which no substantial grounds are shown by the proceedings before us. A saving of outlay even to the full extent of Lord Hobart's expectations during the next ten or twelve years would not compensate for the embarrassment that a stoppage of revision would entail.

As far as it has gone, there is reason to believe that the settlement has met with the acceptance of the people interested, and as recent instructions, from the Secretary of State have inculcated careful testing of material increase, which, when authorized to a large extent, is to be leviable in easy instalments, a demand

above the ordinary ability of the ryot to discharge is sufficiently prevented. The notorious irregularities of previous assessments will by the new work be regulated, and the rights of the State maintained.

To stop short after we have so far proceeded, and to leave some entire districts under a carefully revised assessment, and others partly under the new and partly under the old system, would indeed be an unfortunate admission of the charge of instability and the absence of finality which the frequent changes in our rule have inspired in the Native mind.

There are some districts where nothing has been done towards the introduction of the new survey, such as Tanjore, where the existing settlements, seem sufficient for all practical purposes, also Malabar and South Canara, and I think that it would be advisable to leave such districts untouched till all others are completed, when the propriety of extending operations to these can be considered and decided. This would relieve the establishments, and admit of concentrating their work, and should diminish cost and period of completion of the task at present undertaken.

The orders and final decisions on all matters connected with survey and assessments have hitherto emanated from the Court of Directors and Secretary of State in Council, and issued direct to the Government of Madras without the intervention of the Government of India, and I do not perceive sufficient reason for departing from the course hitherto prevailing, and for waiting for the criticisms of the Government of India on the proceedings of the Madras Government. I believe Sir George Campbell has rightly described the capacity of the Government of India to undertake this duty, and as they are not likely to afford more information than is now before us, no advantage is likely to arise from deferring to accept the responsibility of early action in a matter requiring as early authoritative settlement as possible. I, with Sir G. Campbell, strongly advocate general approval of the course which has been decided by a majority of the Madras Government and the enforcement of a vigorous prosecution of work by all engaged in it, with such augmentation of subordinate establishment as can be brought under the efficient supervision of the existing controlling heads of departments. I cannot admit the justness of Sir G. Campbell's imputations on "the honesty and activity" of the Madras authorities. I believe there has not been any such "half-hearted sort of way" in their work as he supposes.

That the ryots should suppose that Sir T. Munro's settlement was of a permanent character is not astonishing seeing that it has continued in unaltered operation for nearly 70 years. But however that may be, these settlements were pitched at so high a rate that they are not likely to be exceeded by any revision. During Sir Thomas Munro's Government a permanent remission of one-fourth on wet, and one-third on dry land assessments was conceded, and though the puttahs given to the ryots state the higher rates as the proper Government demand, they also state that a remission to the above extent is made, and I believe there is no express confirmation by Government of intention to make such settlement permanent. The doubts of the power of Government to increase rates of assessment made by Colonel Munro in North Canara may probably be found to exist in Bellary and Cuddapah, but hitherto there has been no organized opposition in those districts to advances towards a revision of assessment.

I will not venture on offering my disagreement with the views of Sir Louis Mallet, beyond pointing out the refutation Mr. Sim's Minute affords to the fanciful idea of the Governor of Madras that, under explicit instructions from home, a costly machinery is maintained on the basis of "half net profits" (or produce), which is practically set aside by a more supposed simple process. I can find no grounds whatever for his Lordship's assertions, and I would add my dissent from the con-

clusions arrived at by Sir Louis as given in the two last paragraphs but three of this Memorandum. In every district in which it has been my lot to serve, I have found instances the very reverse of what he believes to be the normal condition of the agriculturist.

In Tanjore there are numerous wealthy Meerassydars holding large extent of land, paying revenue to Government, who are most liberal in the distribution of the wealth they have accumulated from excellent management of their lands, and the general condition of the people is one of comfort and competence. Of course, as in England, there are frequent examples of prodigality and indolence, but I would demur to this being the prevalent habits of the higher classes. In Tinnevely there has been a profusion of expenditure on the part of the well-to-do agriculturists in works of public utility, and here also the general condition of the people is far above the poverty to which naturally some classes, as in our own country, are exposed. In Nellore there are very many wealthy occupiers of land, and in Cuddapah are to be found men of great wealth and importance derived from land paying revenue to the State.

It is, I believe a fallacy to assert that the ryots of India do not understand the culture of their land. I can point out tracts of districts where the cultivation of the soil is as efficient as it is in our own country, where crops as abundant as can be are produced, and where systematic attention is devoted to farming operations. It must, however, be remembered that the very scientific system of farming of late years introduced into England is not in all cases applicable or profitable to the Indian soil, and although undoubtedly there is room for improvement in the ordinary process of cultivation adapted to the requirements of the soil and the wants of the people, there is, on the other hand, a practical course of husbandry which brings forth in favourable seasons abundant returns, without recourse to chemical manure and implements only of late years in use in England, to meet the increasing cost of manual labour. I trust that, in considering the question, now submitted for the decision of the Secretary of State, it will be borne in mind that systems of revenue management that may be applicable to the Punjab, the North-West Provinces, and Bombay, may not be advantageously introduced into Southern India.

We all have our views as to the best system, and though that in force in Madras may not meet with the full approval of experienced revenue administrators elsewhere, it is in the main the result of the study of the most experienced Revenue authorities of that Presidency, and it is believed by them to be the best suited to the wants of the country. There are, of course, differences of opinion in matters of detail, which I would submit are best left for disposal by the local government. But I would deprecate attempts to adapt even the ascertained or apparent advantages of other systems, and I would refrain from any important departure from the orders already issued from Home Governments which are now in force, and I would simply direct the carrying on of the assessment on the principles already laid down in those districts where it is proposed this should be introduced, and that this work should be vigorously pursued, under the supervision of the Madras Government, from whom reports of progress should be periodically made to the Secretary of State.

The Madras system seems to me to have, at all events, one superiority over that of Bombay, viz., that the assessing part is not executed by the scientific survey officers, without apparently communication with the District Revenue officers and without control, whereas, in Madras, the survey is alone the occupation of the scientific department, and the assessment and arrangement of rates is the duty of a separate Revenue Department, acting under the general control of the Board of Revenue.

H. G. MONTGOMERY.

4th March 1875.

MINUTE BY SIR ERSKINE PERRY.

A very grave question is raised by these papers for the decision of the Home Government, and however much I may shrink from the task of dealing with the complicated questions of land revenue arising in Madras, with which, like all my colleagues, except Sir Henry Montgomery, I have had no practical experience, still it is our duty to apply our minds to the arguments presented to us and decide between them. The position of the Secretary of State in Council, in a case like this, resembles that of a Judge in a patent cause, who, without any converseance with science himself, has to deter-

mine between the conflicting opinions of scientific experts.

The question in substance to be decided is, whether the Settlement, which was commenced in 1857, and which has continued for the last 15 years at a cost of (say) 430,000*l.*, and the completion of which will cost (say) 193,000*l.*,¹ shall be abolished.

The conflict of authority upon this question is very great. The Governor, adopting the views apparently

¹ Board's Report, para. 4.

of the Revenue Secretary, and the Board of Revenue are in favour of the abolition, the Madras Government have decided on completing the work. It is the business of the Secretary of State to decide between these conflicting views.

The survey and settlement of the Madras Presidency was determined on after ten years of deliberation by the Madras Government, and met with the "unanimous approbation" of the Governor-General in Council. An exhaustive despatch of the Court of Directors (prepared by Mr. Prideaux) in 1856 gave full sanction to the proposal, and its perusal shows that the great expense and length of time contemplated for the undertaking (15 or 20 years) were willingly encountered, not for the purpose of procuring additions to the Treasury, but for the benefit of the cultivators of the soil. It was justly supposed that in an over-assessed Presidency as Madras then was, and where entire ignorance prevailed as to each man's holding, common justice required that certain fairness of assessment, and mutual knowledge of respective rights, should be introduced into the relations between the State and the cultivators of the soil. It now appears that the survey and settlement, instead of being completed in 15 or 20 years, and costing 765,000*l.*, have taken 16 years for the completion of little more than half their work, and the cost of the two processes has been "nearly one million sterling." And it is urged that one of the main objects of the survey and settlement has disappeared, viz., the distress of the cultivators and loss to the revenue owing to the prevailing low prices, which had produced over assessment on the poorer lands.

The Governor, therefore, proposes to allow the Survey to continue, but to dispense altogether with the Settlement Department, by which 200,000*l.* "would be struck off from the taxation of the country."¹

On reading carefully the arguments pro and con, I cannot but think that it would be a lamentable example of unstable government if we were to reverse the deliberate decision of the Court of Directors in 1856, and which may be said to have proved most beneficial, for it has not only placed the situation of the cultivator on a sound basis, but it has increased the revenue 40,000*l.* a year.

The substitute for the settlement now in operation,

which Mr. Dalzell suggests and the Governor approves of, viz., a rough settlement by the collectors, failed signally when it was before tried in 1864-68, and the multifarious duties pressing on the collector demonstrate clearly, I think, that it will fail again if again tried. I therefore trust that the Secretary of State will approve of the conclusions of the Madras Government.

With respect to Sir Louis Mallet's paper, I would venture to suggest that speculations as to whether the Government demand from the land amounts to rent or revenue belong to the class of what the French call *speculations oisives*.

Government in India has always assumed a right to take what it chooses, and the amount claimed as its due has for the last 3,000 years varied between such wide limits as one-fourth and one-twelfth of the gross produce. In the former case, the amount would be on certain soils rent, in the latter, it would be only revenue. In the Madras Presidency, up to very recent times (and perhaps even now), the assessment on the poor lands amounts to a rack-rent, and this is shown by the cultivator ceasing to cultivate land when he finds he can obtain no profit from it beyond the expense of production.

The 50 per cent. of net profits is stated by Sir Charles Wood, in his Despatch of 1864, to be equivalent to half rent, but in practice I apprehend in Madras no nice calculation is ever made, but the care of the Collector or Settlement Officer is directed towards making the assessment on each field moderate.

8th March 1875.

E. PERRY.

P.S.—I would add, that if Lord Salisbury approves of the decision of the Madras Government, opportunity should be taken in the reply to correct the rather hazy views of the Government of Madras as to the principle of enhancement. Reference should be made to the position taken up by the Home Government (referred to by Mr. Maltby), that moderate enhancements should be periodically made, when the general rise of prices justifies it, and the consistency of this view be shown with the desire of the Home Government that assessments generally should be moderate, and that enhancements when made should be imposed gradually.

8th March.

E. P.

MINUTE BY SIR H. MAINE.

There is only one branch of this difficult subject on which I think that I can observe with any advantage.

I concur with Sir George Campbell in considering that the question raised by Sir Louis Mallet's Memorandum is in the main a question of words, but I do not altogether agree with Sir Erskine Perry that for that reason it is a "*speculation oisive*." Since I have had any knowledge of India, nothing has seemed to me more remarkable than the degree in which the ideas of the Indian Government, and consequently the fortunes of the Indian population, have been affected by what I regard as questions of words, questions, namely, as to the words descriptive of Western phenomena which can properly be used of Eastern facts and institutions. I suppose, with Sir Henry Montgomery, that whole volumes have been written on the point whether the revenue habitually derived by Oriental Governments from land is best described in European phraseology as rent or tax. And a scarcely smaller bulk of printed paper has been covered with dissertations on the protected hereditary tenancy of the East; one set of disputants affirming and the other denying that it can be reconciled with the Western conception of ownership; one drawing the inference that it ought to be encouraged, the other that it ought to be discouraged or abolished. Of course I do not mean to say that questions of substance are not constantly agitated in these controversies, but they seem to me to have a tendency to go frequently astray and to lose themselves in questions of words.

If it is absolutely necessary to answer the question whether the land revenue taken from time immemorial by Eastern Governments is or is not rent, I imagine that the answer must be in the negative. It seems to me incredible that any Government, since the beginning

of history, should have taken the exact economic rent of the territory occupied by its subjects. In order to obtain this, a Government must have put up the soil in parcels to competition, without recognizing any hereditary right in any one person which entitled him to be preferred to another person who bid higher for the occupation. No evidence of any such system exists; some preferential rights, whether they can or cannot be called ownership, have always been acknowledged. But unquestionably Oriental Governments have occasionally absorbed all but the whole of the fund from which rent would come under a system of the Western type, and indeed have probably gone further every now and then, and have encroached on the scanty capital of the cultivators. I do not know how far the remarkable investigations of Mr. Edward Thomas, the eminent Indian antiquarian, on the financial resources of the Moghul Empire, have attracted notice. There appears to be documentary evidence, trustworthy within no very wide limits, that, out of the total revenue which the Moghul Emperors, at the end of the 17th century, took from a territory roughly corresponding to the present British Indian Empire, extending rather farther to the north-west and not quite so far to the south, the portion answering to our land revenue, amounted to no less than 35 millions sterling. As India was certainly not more prosperous in the 17th than in the 19th century, these prodigious figures are only intelligible on the assumption that the whole, and occasionally more than the whole, of the fund under other circumstances available for rent was exhausted. Whether they are entitled to absolute credit or not, they are probably quite accurate enough to indicate the character of the system of land revenue which the English inherited from their Mahometan predecessors.

The considerations which led a certain school of Anglo-Indian functionaries, and a certain number of English theorists on India, to speak of the Indian land revenue as rent, and of the power in virtue of which it is taken as ownership, may be understood, as it seems to me, readily enough. These terms did really express to an English ear, better than any others, the nature of

¹ This singular remark could only proceed from one accustomed to look at Indian facts with English eyes, the source, according to James Mill, of most of our errors in Indian Government. If 200,000*l.* were saved in this quarter, a Native would say it will only be thrown away in some other English whimsey.

the right which was exercised by Indian Governments. The morality current in England did not forbid the exaction of an extreme rent from a tenant, just as the morality current in India did not forbid the exaction of excessive contributions from a subject in virtue of the land which he occupied. Again, as Mr. J. S. Mill pointed out, the direct effects of payments of land revenue, and of payments of rents, on the general mass of cultivators are precisely the same. So long as the occupier of land must make over a portion of the produce raised by his labour and capital to somebody else, it does not directly concern him whether the transfer is made under the name of rent or under the name of revenue. No doubt the indirect results of the Eastern and of the Western systems are extremely different. Under the former the whole class, which consists of receivers of rent, either does not exist or is reduced to comparative insignificance, and from this many important economical and political consequences follow. Nevertheless, we must be just even to systems which exact excessive contributions from the land. He would be a bold man who asserted that an enlightened government putting on the land taxation so heavy as virtually to extinguish the landed proprietary, but spending the produce of taxation wisely according to its lights, would have been a curse to the Ireland of 150 years since. Where you have great scarcity of capital, a spendthrift proprietary, and a religious system which actively encourages an inordinate growth of population, there is still something to be said for the fiscal rights of the State as against the privileges of ownership.

The rival theory that the Indian land revenue is a tax, is so far more correct that we in Western Europe have agreed to apply the word "tax" to every exaction of the State from persons recognized as owners; and the English Government has never pushed taxation so far as to obliterate ownership. The chief objection to the word appears to me to be that it carries with it associations with the land tax, which in all European countries is only one tax among many, and which is especially light in England. The Indian malcontents who visit this country have discovered the advantage

given to them by this association, and dwell upon no topic more constantly than the enormity of the Indian land tax. It is certainly unfortunate, but the lighter our assessments of land revenue become, the more does the land revenue come to resemble a land tax, and the more plausible are the arguments against it.

It is much to be wished that questions whether the land revenue is rent or tax, and inferences from one view or the other, would give way to unbiassed inquiries whether the heavy or permanent assessments, which generally go with the theory of rent, or the light assessments, which are usually associated with the tax theory, do most to improve the moral and material condition of the great mass of the population. Even a superficial observer, whose eye has once been struck by the extraordinary difference between the miserable cultivators of Lower Bengal and the prosperous peasantry of Madras and Bombay, cannot shake off a suspicion that some theory or set of preconceived opinions prevents our ascertaining, as a matter of fact, what is the agrarian system which does most for the happiness of the people of India.

There have doubtless been a series of compromises on the subject of revenue, as Sir Louis Mallet observes, during the whole period of the British government of India. But I must enter my protest against describing them as a struggle between "communism" and the recognition of private rights. We often hear all resistance to the abolition of protected tenancy stigmatised in India as socialistic, and all vindication of the rights of the State to land revenue denounced as communistic. But the application of very modern words to very ancient things, which is always of doubtful propriety in many ways, has a tendency to effect a dangerous reversal of the burden of proof. He who in India wishes greatly to diminish the land revenue and to extinguish co-ownership and protected tenancy, is not on the Conservative but on the ultra-Radical side, and must be listened to with all the reserve demanded by the arguments of those who would put an end to institutions of enormous antiquity, bound up with the whole mechanism of government and society.

March 13th, 1875.

H. S. MAINE.

MINUTE BY SIR BARTLE FRERE.

I think the discussion raised by Sir Louis Mallet is a very useful and practically important one. But a good deal of the difficulty he, and I may add others, find "in recognizing any common understanding between local authorities as to the relation of Government to the occupiers of the soil," seems to me due to the want of accurate definition of the sources of public income which we are discussing.

We talk of "land tax," "land assessment," &c., without recollecting that the land revenue of India, or of almost any district in India, generally includes specimens of almost every conceivable form of income, public or private, which can be derived from land, or from what we in England call real property.

First, there are variations in the proportion of the produce of the land which the State exacts, as we shall see if we note a few of the best known classes of such income from land in India:—

1. *A true land tax*, accurately fixed according to known rules at a certain proportion of the true rent or annual value of the land.
2. *A land tax fixed more or less arbitrarily*, and absorbing a varying proportion of such rent. Sometimes such a tax is fixed,—
 - (a) In permanence. In such cases the proportion of rent absorbed must vary greatly and for ever; because, while the amount of tax is fixed, the elements which affect the true rent are perpetually varying.
 - Sometimes the tax is fixed,—
 - (b.) Only for a limited term of years, in which case the variations from a real land tax will be smaller and less permanent.
 - Sometimes the tax is fixed,—
 - (c.) From year to year, in which case it might, theoretically, be made to correspond to the true land tax, but in practice, for very obvious reasons, it never does so.
 3. *A quit rent*, or acknowledgment of ownership, or superiority of tenure, or sovereignty, in a great variety of forms, as tributes or fees, or reduced rent, such as we in England know as quit rent, chief rent, feu, compensation for heriots, &c.

4. *A full rent*, leaving nothing to the cultivator but the wages of his labour and the interest on his capital.
5. *A rent, and something more*. Sometimes trenching on the wages of labour or the profits of capital; sometimes the tax-receiver supplies a share of the capital, and takes interest for it.

The reader of much of the literature relating to Indian land revenue would suppose that it came for the most part, or at least very frequently, under Class I. as a *true land tax*. But with the exception of a very few localities, almost infinitesimally small in proportion to the total area which pays land revenue in India, such a *true land tax* is practically unknown.

I can only at present call to mind a few scattered properties in the Presidency towns and a few villages or small clusters of villages where a *true land tax* is paid to Government.

The greater portion of Indian land revenue comes under Class II., a *land tax fixed more or less arbitrarily*, and absorbing a varying proportion of rent. Most of the Bengal land revenue would fall under Subdivision (a.) of Class II.; all three classes, (a.), (b.), (c.), will be found in Madras; (b.) generally in the Punjab, Bombay, the North-West Provinces, and Central India, with some instances of (c.), which is also the subdivision under which the land revenues of Burmah and of most Native States would fall. A few specimens of (c.) will be found everywhere, especially in the wilder and least settled tracts.

Class III., a *quit rent*, will be found frequently in Bombay and in Native States, under such terms as "*chaut*," "*salamee*," "*mokassa*," &c.

Class IV., a *full rent*, is not often recognizable like the others by the terms of the engagement between Government and the persons paying land revenue; but anyone who will take the trouble of going carefully into the subject will be able to satisfy himself that the State often takes a *full rent*, even when it professes and believes itself to be taking a mere land tax or share of that rent, under Classes I. or II. Indeed, I have known many instances of lands nominally held under Class III., at what was intended to be light quit rents, abandoned because, through change of prices and other circum-

stances, the owner found that the Government demand absorbed more than the full rent.

It might seem almost impossible that the Government demand should ever amount to what is defined as Class V. (*rent and something more*), but in my early years, when assessments were high and prices low, I often met with whole districts in the Deccan where the cultivator could not pay the Government demand without trenching on his own wages as labourer, to the extent of his having less for himself than a hired labourer would require, and where the capital was more or less irregularly supplied by Government advances (*taccavee*, &c.) for which interest was charged by the State. Instances of this kind may now be comparatively rare, but I am satisfied I could produce a few in most provinces.

Let us note, also, that though the demand of the English Government is generally a money sum charged for a specified area, either ascertained or estimated, this is not always the case; and in many wild outlying tracts of British India, in parts of Burmah, and very frequently in Native States, the Government demand is still taken by a share of the gross produce in kind, or by such devices as poll taxes, house taxes, taxes on the plough, pair of bullocks, billhook, or hatchet. In all such cases it is of course impossible to say how much of the true rent the Government demand absorbs.

Secondly, there is infinite variety in the *class of persons* connected with the land who are required to pay the Government demand. For example:—

1. Sometimes the demand is from the sovereign or quasi-sovereign. When he is a great chief or ruler the demand will probably appear under a separate heading, as tribute of some kind; but many of the Indian sovereignties or quasi-sovereignties are smaller than the smallest of our European petty states, and in many of our remoter and less settled provinces, and even in some very old and well settled and civilized provinces, like Kattywar, it will be found that our Government, and still more frequently a Native State, takes a very small sum from a very small chief and credits it to "land revenue," though the political status of the payer is really that of a chief, managing his own estate despotically and independent of our laws, and himself levying taxes from the owners or occupiers of land.

2. Still oftener, it will be found that Government deals with a great landholder, who does not assert any right of personal property in the estates for which he pays the Government demand. Numerous instances of this kind will be found in parts of Bengal, Madras, and elsewhere.

3. Government often deals with a head man more or less improvised by our settlements as the payer of the Government demand, on behalf of all sorts of persons liable within a fixed area. Such are head men under various names, "talukdars," "lumberdars," "malguzars," &c., &c.

Sometimes these men hold their position by ancient custom, but very frequently they are the creatures of their own recent settlements, devised to save time and trouble in ascertaining who ought to pay to Government and how much, and they are fertile causes of every kind of confusion and oppression.

4. The Government demand is sometimes paid, according to fixed custom, by co-sharers in the produce of a given area. Specimens of this mode of levying the Government demand may be found under various names (*baghdaree*, &c.) in various parts of India, and sometimes the system is very ancient.

5. The Government demand is often paid by the real landowner, the man who is acknowledged by law or custom as the proprietor of the soil, with a right to let or sell it.

6. The Government demand is often paid by the cultivator, who claims no right of ownership in the land and cannot by custom or law complain if at the end of

a season his land is taken from him and given to another to cultivate. (But I may notice that, even where this liability is most unhesitatingly admitted in terms, the enforcement of the right of ejection would be looked on as a great hardship.)

Now, I believe that most of these variations in the persons from whom the Government demand is leviable could be found even where such want of uniformity would be least suspected, say, for instance, in the parts of Bengal under a permanent settlement. But it is clear that, as long as these variations exist, it is hopeless to expect "any kind of common understanding" or agreement between the local authorities as the "relation of Government to the occupiers of the soil" throughout the whole of India.

Again, thirdly, if we look to any given area, not smaller than that of a village, it will be found that *different parts of the area* contribute to the Government exchequer in very different proportions. These will almost invariably be,—

1. Rent-and-tax-free lands ("inam," "mafi" &c.), the grants of former sovereigns and landholders to court favourites, priests, &c. In some parts of the country, as in Guzerat, the quantity of such land is largely increased by lands the freedom of which from assessment has been purchased, or got by a kind of mortgage, in consideration of sums of money advanced to the principal landholders in troublous times, and the freedom from assessment has been so long recognized by usage that it has become a legal title ("vechan," "geran," &c.).
2. There are lands held rent-or-assessment-free in consideration of service ("chakri inam," "jori inam," &c.). In many parts of the country every village artisan and official has a slip of land so held more or less rent-and-tax-free.
3. There are lands paid for in money or in kind, and under various tenures, more or less indicating absolute proprietorship, with rents or assessments often varying according to the more or less absolute character of the property (*oopuri*, *mirasi*, *guthkoh*, &c. &c.).
4. The assessment is often more or less heavy, according to the caste of the cultivator; in some parts of the country the lower or wilder castes pay more, in some they pay less, than ordinary cultivators, according to the degree in which they are dreaded from their numbers and lawless habits, or considered convenient subjects for heavy taxation. The priestly and soldier classes are apt everywhere to get off easily.

I know it is a favourite doctrine that these variations are only to be found where they are noticed in the Government returns; that they exist in Madras and Bombay, and do not exist in Bengal; but the fact is they exist everywhere, and quite as much in Bengal as anywhere else, although they generally remain unnoticed, except by those who inquire for them, because the Government officials have nothing to do with anything save the kind of quit-rent which is levied from the zemindar. But any intelligent Bengal zemindar who knows his own estate well at once tell you that every one of the variations I have detailed, whether as to the area which contributes, the proportion of produce contributed, or the persons by whom the contribution is paid to Government, or to the Government representative, the zemindar, are to be found in every district in Bengal.

This fact explains another anomaly, which is constantly noticed in the great disproportions which exist in the amounts contributed to the State by different parts of the country as compared with either the area or the population. I give, for example, the figures nearest at hand for 1871—72.—

	Bengal.	Bombay.	Madras.	North-West Provinces.	Punjab.
Net Land Revenue - - - -	£ 3,651,000	£ 2,744,000	£ 4,016,000	£ 3,682,000	£ 1,763,000
Area in square miles - - - -	230,832 (exclusive of waste, forest, and rivers.)	127,532	141,746	80,901	101,752
Population - - - -	64,000,000	73,250,000	30,000,000	30,000,000	9,500,000

I have not the figures for Burma, but the disproportion between the figures for that province and, say, Bengal is yet more striking than the figures here given.

It is constantly asked.—Why is the contribution of fertile and populous Bengal so much smaller per head and per square mile than that of other less favoured provinces? But any one who goes into the details of land revenue will find that in the one case Government gets merely a land tax, which absorbs a very small proportion of the rent, and allows something to one, and often to many, middlemen, between the taxpayer and the producer. In the other case the Government takes always a large part of the rent, and sometimes the whole, and occasionally more than the whole rent.

Various propositions have at different times been made for assimilation in the direction of introducing the Bengal permanent settlement system into other parts of India, but it is difficult to see who could benefit by such an assimilation. There would be no real approach to the imposition of a true land tax, fixed according to definite rules at a uniform proportion of the rent, because no tax of this kind has ever existed in Bengal or anywhere else (with a few very rare and unimportant exceptions) save on paper. The Bengal permanent settlement is not a bit nearer a true land tax than the "ryotwari," or village settlement of other parts of India. It is simply the impost on the land which we found actually levied by our predecessors, somewhat abated so as to admit of a middleman taking the risks of collection. This middleman is not necessarily either the owner or cultivator of the land. He has acquired by Lord Cornwallis's Regulation a saleable intermediary property, which may be divided, and often is divided, into one or many successively subordinate properties, constituting many instead of one middleman between the occupier of the land and the Government.

Of course the creation of such rights of intermediate property, like the creation of any other property, has its advantages; but not in the shape of improving either the Government revenue, or the portion which would remain as true rent, or true wages of labour, or true interest on capital, in the hands of landlord, cultivator, or capitalist.

Of course, it sometimes happens that the party in whose favour the English Government abated the demand of its predecessor, the Mahomedan Government, may be identical with the owner or cultivator of the land, or the capitalist. But such union is accidental, not essential, and the benefit conferred by the settlement on the recipient of the abatement would have been equally great, had an equivalent income been given in any other form.

What, then, are the lessons deducible from the facts stated?

1. That the Indian land revenue is rarely, if ever, a true land tax or capable of being converted into a true land tax, except by an inquiry much more tedious and detailed than has ever yet been undertaken, to ascertain the true rent, and the person who pays it, and also the person who enjoys it, and who would have to pay the land tax when fixed.

2. That such a process of limiting the Government demand to a true land tax would certainly greatly reduce the land revenue in most parts of India, and, if the system were uniformly carried out, would as certainly involve logically an increase in the demand on many estates under the permanent settlement.

3. That the Indian land revenue is made up of a great variety of forms of income from land, and that such varieties may be traced, not here and there, as exceptional relics of extinct systems, but everywhere throughout India, so that the land revenue resembles in no way our English land tax, but rather the income of some great landed proprietor, such as the Duchy of Cornwall, or any of the old landed aristocracy, on

whose rent roll may be found all kinds of forms of income from land, houses, mines, waters, &c.

4. That the rules as to what shall be levied as land assessment in India, and from whom, depend in most cases upon custom, and very rarely on enactment by statute, the statute, where one exists, presupposing what is called "a settlement," one part of which is an inquiry into all rights and liabilities connected with land. This inquiry has been sometimes systematic and exhaustive, but it has been often very hasty and superficial, and an immense amount of wrong-doing and confusion has been, and is, the result of its imperfection.

5. That the process required to correct this imperfection is,—

(a) Careful inquiry and record of facts connected with land, its produce, &c., the customary rights and liabilities attaching to it,

(b) A raising or lowering of the Government demand, so as to make it easily payable by the person liable for its payment to Government, according to the usual custom of the country.

In doing this, custom and past usage are mainly to be consulted. It cannot possibly be done, at any rate for many years to come by statutes regulating the payment by fixed rules which give an invariable proportion of the rent to Government. The true rent must be first ascertained, and this we rarely know at present, nor is it easy of ascertainment. The process must in fact resemble not so much the assessment of a land tax in England, as the careful nursing of a neglected estate by a good land agent, and the mode of doing this will necessarily vary greatly, not only as the management of a good agent in England varies from that required in Scotland or Ireland, but as the management of a Hungarian, Polish, Wallachian, or Spanish land agent would vary from that of an agent in Great Britain, France, or Germany.

In the immediate case before us, that of Madras, I think it has been clearly shown by Sir Henry Montgomery and others, that the suggestion to stop the process now in operation for a revision of the assessments was hasty and ill-considered; but I would go further, and so far concur with what I understand to be Sir Louis Mallet's opinion, that not only in Madras, but everywhere else, a much more careful and elaborate investigation, record, and classification of rights and liabilities connected with the land should be attempted, and should, in fact, be always in course of correction and amplification, as long as the land revenue forms such a large proportion of the public income.

This may often be done by means of the revenue settlements now going on in various parts of India, with some addition to the existing system of ascertaining and recording facts connected with the land. There were several very useful suggestions on this subject two or three years ago in the first detailed notice of revenue survey contained in the Report on the Moral and Material Progress of India; the respective merits and defects of the different systems of surveys were there pointed out, and the mode in which a perfect system might be devised, by taking the best features of all existing systems, was indicated.

I think it would be well to call the attention of the authorities in India to the subject, with a view not only to improve, in the manner above indicated, the existing surveys, but also to systematize and render more accessible their results. There is probably no subject connected with the agricultural population, the statistics of which might not be supplied from the village and survey records; all that is wanted is the means of reducing these materials to manageable forms, and this, I should think, might easily be done in the Statistical Department, if they had access to the vast stores of knowledge contained in the village and survey records.

10th April 1875.

H. B. E. FRERE.

FURTHER MINUTE BY SIR LOUIS MALLET.

I am afraid that I only find in the Minutes of Members of Council on my paper of 3rd February last a confirmation of the grounds upon which I ventured to express my uneasiness at the confusion of principles which prevails in the administration of the land revenue system of India.

Sir Henry Montgomery urges that "volumes have been written on the subject during the past century," and I doubt whether the advocate of either side has been persuaded by the arguments of his opponent. I would ask, why have volumes been written on the

subject if it is one of no practical significance, and written, not by speculative philosophers, but by men engaged in the matter-of-fact work of administration? I fear that, until some rational and consistent principle be adopted by the Government of India, many more volumes will continue to be written upon it, and that, if our efforts to promote education in India are attended with any success as time goes on, it may take a form which may make it impossible to regard it with indifference.

Sir E. Perry asserts that "Government in India, has

always assumed the right to take what it chooses" from the land, and describes the limits within which this right has been exerted during 3,000 years! This is a long time to go back for a land system, but, confining ourselves to the Mogul Empire, it seems to me a very unsafe defence of our present policy.

Sir E. Perry would, I think, readily admit that the doctrine of Government to which he refers, although very appropriate and sufficient at the Court of the Great Mogul, might be made to form an inconvenient text for House of Commons orators and newspaper correspondents appealing to the British householder. And even now, is it not nearer the truth to say that the Government of India takes, not what it chooses, but what it dares?

This brings me to some of the remarks of Sir G. Campbell and Sir H. Maine, which equally appear to me to ignore the source from which the Government of India derives its power has changed and is changing daily, and that, if India is to be maintained, and rendered a permanent portion of the British Empire, this must be accomplished in some other way than by placing our future reliance on the empirical arts of despotism.

Sir G. Campbell says that the question is one of words. I cannot agree in this opinion. I am afraid, as Sir H. Maine has detected, that Indian Governments find their account in this obscurity, and know well enough that, by holding this question in suspense, they keep two strings to their bow, and escape the horns of a grave dilemma.

Sir G. Campbell's statement of the case appears to me to beg the question at issue. He says, "We now take, as nearly as we can, *half the rent* of lands not permanently settled, and whether we call that rent, 'revenue or rent, the fact is the same.' Certainly, but the whole point of the discussion is whether, if we called our demand revenue instead of rent, we should be able to continue to take that half, or whether, if we called it rent, we ought not to take the whole, and whether the system which has grown up gradually is not so full of inequality, and injustice, and uncertainty, as to be a source of future danger and disaffection. Instead of consoling ourselves with the thought that the land under the Mogul Empire was more heavily burdened than now, is it not a more profitable question to ask, what will be the verdict on our land system when the agencies of western civilisation, which we are bringing to bear on India, have borne their fruit on modern native opinion, and is it not better to prepare in time for changes which can hardly be avoided if the unity of the Empire is to be secured?"

One effect of the present attitude of indifference assumed by the Government on this question, of itself no slight evil, is that while, unless I am much mistaken, the land revenue has now become such a vital Imperial resource that the provincial redistribution of it which would be inevitable in any scheme of federation would be an almost insuperable obstacle to such an experiment, the facilities which it affords indispose those engaged in the work of governing to look at all in the direction of the financial reforms, which are, as it seems to me, the necessary condition of a policy of centralisation and unification. For, if this policy be pursued, the day must come, and ought not to be distant, when, even with a people so helpless and so silent, there must be some recognition of the duty of redistributing the fiscal burdens of the people in the several provinces with a greater regard to equality. When that day arrives the question of revenue and rent will not be a "*speculation visive*."

I have said that the present system is unequal. It is unequal both between province and province, between district and district, and between man and man.

I append a statement of the contributions per head of population and per square mile to the land revenue of India, by Bengal, Bombay, Madras, the North-West Provinces, and the Punjab respectively, which speaks for itself.

The recent papers from Madras reveal various forms of inequality in the different districts of the Presidency, and a very dangerous pressure in some.

I need only refer to the recent correspondence on the subject of the late resolution of the Government of Bombay, to show the confusion and mischief at work in that important province.

The accounts which I have received of certain recent Bombay settlements strongly confirm everything which I have said as to the practical importance of clearly distinguishing between rent and revenue. Assessments have been raised 70 or 80 per cent. in one stroke, in

conformity with certain artificial and arbitrary rules often at variance with actual facts, and raised distinctly under the influence of the rent theory, which has been warmly advocated of late years by Mr. Knight and others.

I am also informed that, in many cases, lands have been assessed which barely pay the cost of cultivation, and yield no rent at all. This is not a question of words to the cultivator.

It seems to me that enough weight is not given to the changed aspect of this question owing to the assumption of the sovereignty of India by the Crown, and the recognition of its natives as British subjects. It is always said that it is idle to apply English ideas to India, but if any of those ideas are of a kind which an important class in India sees its clear interest in adopting, is it safe to assume that they will never do so?

So long as the exactions from the land by the State were levied by the Company as the inheritor of despotic Governments, and frugally dispensed in the several functions of administration, or even sent in form of tribute to England, I can understand the Indian people accepting their fate without dangerous impatience, as a customary incident in their condition. But when the sums so taken are largely spent, as they now are, for the avowed purpose of benefitting the Indian Empire and people at large, on public works, education, health, famine, and all the objects which under the influence of modern ideas fall within the province of State expenditure, and attempts are made more and more to resist and remove taxes such as income tax and Customs, which fall on other than the landholding classes, while to meet the increasing burdens of the State additional charges are laid on the land, may they not awaken to the fact that they are being made the subject of an experiment, which, I venture to think in spite of Sir H. Maine's criticism, can only be appropriately described, wherever it is found, as "communitistic."

It is, I think, impossible to deny that there is some danger in this direction, and it cannot, I believe, be safely met by temporizing, and by leaving to the enemy so formidable a weapon as the theory of State landlordism. Nearly all modern Anglo-Indians, so far as I have seen or heard,—the whole generation of English public men and economists trained by Mill, and Manchester for the sake of a free trade tariff,—would in this country warmly support in principle the largest possible appropriation of the rent of the land. What degree of support their policy would now obtain, or may hereafter obtain in India, I cannot pretend to say, but Indian opinion does not always go for much, and much is in the power of an all-embracing and powerful bureaucracy, with the press in its hands, and with a Government at its back, which may be any day at its wit's end for money, and which can hardly undertake an object on which it has set its heart, without a cess on the land.

From this point of view, the policy of further taxing the land might easily become a political danger, and the large margin on which under the rent theory, the State has a right, if it be not a duty, to encroach, lends itself too easily to such an extension.

In an economical point of view, I regard such a policy as especially mischievous.

The function of rent is to restrain the undue pressure of population on the soil. The presence of rent is the result of the demand for land pressing on the supply. To take the rent and divide it among the whole population, which is done when it is substituted for taxes, is to counteract and neutralize the operation of the law of supply and demand, by stimulating the demand anew without increasing the supply, and tends directly to a progressive pauperization of the community.

For these reasons, without disturbing past settlements, which we cannot afford to do, and cannot now do without gratuitous fiscal sacrifices, I shall rejoice to see a limit placed on future assessments, with a view to which the renunciation of the theory of State landlordism, would be the most effectual step. In speculating on its future resources, I should like to see the Government steadily putting rent out of view, as only liable to taxation in common with other forms of property.

Sir H. Maine, in contrasting the possible advantage to Ireland or to India of the appropriation of the whole rental of the country by the Government in lieu of taxation, with the effects of a "spendthrift" proprietary, appears to me to forget that Governments are also sometimes "spendthrift," and also to have overlooked for the moment the difference in the economic results of

the two systems respectively. I say for the moment, because I find in his recent admirable work on "The History of Early Institutions," the following remarkable passage:—

"I believe I state the inference suggested by all human legal history, when I say that there can be no material advance in civilization, unless landed property is held by groups at least as small as families."

Under a system of State proprietorship, the tendency certainly is to stimulate and concentrate population, and to increase the demands on the soil of a particular district or country until there is hardly a potato, or a spoonful of rice, left to divide. Under the system of private ownership the tendency certainly is to restrict, to deter, to disperse, and in the last resort to extinguish by eviction and expatriation the surplus growth of population. I do not agree with Mr. Mill that because land is limited it is not a fit subject for appropriation by individuals, but should be considered as the common property of all. On the contrary, the fact that land is limited, affords the strongest possible reason for its appropriation by individuals, as the only method consistent with personal liberty, by which the population can be kept in due proportion to the means of subsistence.

So long as the present law of population operates, there is nothing short of State control, which can operate with so much force in restraining its undue growth in particular places or countries, as the institution of private property in the soil.

To divide the rent of a country among all its inhabitants, is an act of gratuitous distribution, with no corresponding service rendered by the recipients. The private landlord performs for society functions analogous to those of the forestaller or regrater, in adapting demand to supply, population to means of subsistence. His demand for rent is a warning to pass on to unoccupied lands, and pastures new, or to cease to increase and multiply without replenishing the earth, and it is a warning which cannot be disregarded with impunity, or by the juggler's trick of taking the rent from the agricultural class in the name of the State, and handing it back to the whole population as proprietors of the soil.

It may be said that it is idle to apply an abstract law such as this to a society so vast and complex as that of India, but I contend that it is a far sounder course to start from a general principle, and qualify it as you go along by the thousand considerations which its application requires in the practical conduct of Government, than to discard it altogether, and deal separately with every set of facts which presents itself. This is to embark in a boundless sea of inquiry without chart or compass.

I am not sure that I quite understand Sir H. Maine's last sentence. If his reference to "institutions of enormous antiquity" has any application to village communities, which from the context I hardly imagine to be the case, I entirely agree with him that what he himself terms the "natural communism" of primitive cultivating groups, held together by the bonds of the family or tribe, differs essentially from the communism of modern democratic theories. In using the word "communitic," I had no intention of referring to them or any other ancient Indian institutions, but to the principle upon which we are perpetually urged by the popular school of English economists, with Mill and Cairnes at their head, to maintain and extend our land revenue system, and which are distinctly those of the modern democratic theory to which Sir H. Maine adverts.

That theory is the territorial sovereignty of the nation.

Sir H. Maine, in his recent work, has enabled us to trace the gradual disintegration of the primitive cultivating groups, by the double process of the successive

encroachments of tribal Chiefs on the one hand, with their ulterior developments, territorial sovereignty and the feudal system, and, on the other, of the growth, owing to the decaying authority of the tribe, of a landless outside population, with its modern outcome, the "proletariat."

The principle of absolute ownership, including free exchange, which has been gradually gaining ground in the long struggle against feudalism, privilege, and monopoly, finds itself at last, as the idea of territorial sovereignty represented in the person of the sovereign recedes, confronted with the claim of the proletariat to inherit the sovereignty of the soil in the name of the nation.

Thus are two irreconcilable principles at last brought face to face. On the one hand, the principle of private property and free exchange; on the other, that of State property and monopoly.

Nothing is further from my intention than to give undue prominence to an abstract economical argument, which in all countries, and especially under present circumstances in India, has of course only a limited application, but when the converse abstract principle of State landlordism is so constantly obtruded upon us in official utterances, it is important to call to mind, firstly, that it is not a doctrine which has, so far as I am aware, any Government sanction, and secondly, that it is liable to the most serious economical objections.

I have no desire to extinguish co-ownerships or protected tenancies, or any other existing rights sanctioned by law or usage, although I would not seek by artificial means to perpetuate or extend them, and should not regret their extinction by any natural and peaceful process, and I believe this opinion to be not ultra radical, but essentially conservative in the highest sense.

But, as I have already said, I regard this question of rent or revenue on financial grounds alone, as one of immediate practical importance. I have never concealed my opinion as to the extreme gravity of our financial position, and I believe that nothing but the fact that the present system is almost secure from all independent and intelligent criticism has enabled it so long to survive.

To the inequalities and uncertainties of the revenue system I have adverted in the former part of this paper.

The experiment of an income tax has been deliberately abandoned, probably on sufficient grounds, but this is not a reason for renouncing all attempts to make the industrial and trading classes contribute to the services of the State. The salt duties and the customs tariff both require radical revision before they can be considered safe from the pressure of English public opinion, or be assured of a progressive future.

The opium revenue rests upon a foundation so equivocal and so precarious, that to calculate on its permanence appears to me impossible. The success of our empire in the East depends to my mind chiefly on the creation and development of friendly relations and a vast trade with China. It is enough to say that neither can reasonably be expected while our opium policy prevails.

In ordinary times, there is hardly a chance of any reform in India which does not originate from within, and I cannot but think that the quiescent attitude of Indian financiers in the face of so much that is unsound, is greatly due to their reliance on the rent of the land as a great fiscal reserve on which they can always draw, in case of future difficulties.

I cannot, therefore, resist the conviction that the absence of a clear principle, and an avowed policy, of land revenue, is a source of danger; at all events I hope that I have said enough to show that the subject which has provoked the present discussion cannot be dismissed as one of purely speculative interest.

12th April 1875.

L. M.

1871-72.	Bengal and Assam.	Bombay and Sind.	Madras.	North-West Provinces.	Punjab.
Land Revenue (net) - - - -	£ 3,651,556	£ 2,744,060	£ 4,016,555	£ 3,682,558	£ 1,763,587
Area in square miles - - - -	206,113 *	124,458	138,318	81,403	101,820
Population - - - -	64,599,743	16,288,774	31,281,177	30,781,204	17,611,498
Land Revenue per square mile -	£ s. d. 17 14 3	£ s. d. 22 0 11	£ s. d. 29 0 9	£ s. d. 45 4 9	£ s. d. 17 6 4
Land Revenue per head of population -	1 1½	3 4½	2 6½	2 4½	2 0

* Exclusive of waste lands (the Sunderbans).

MINUTE BY LORD SALISBURY.

This discussion has arisen upon a proposal, by the Governor of Madras, which is not concurred in by his Council, that the expenditure of the Settlement Department should be so materially diminished that its operation would be virtually suspended. Among the reasons he advances for this proposal is, that, partly in consequence of an original understanding, and partly in pursuance of orders from home, the Local Government are practically debarred from increasing the assessment, and that consequently the outlay brings no return. The Council do not accept Lord Hobart's reason or the conclusion, and the papers are sent home in the form which Madras papers now frequently assume—a resolution of the Government passed over the head of the Governor. Sir Louis Mallet writes an important Minute upon these papers, to draw attention to "the absence of any kind of common understanding or agreement between the local authorities as to the relation of the Government to the occupiers of the soil," and further on to "review the inconsistencies of the authorities at home upon the same subject." These inconsistencies are established by citations, and upon these he bases the contention that a definite principle must be arrived at and acted upon in the matter of land revenue, and that a careful distinction must be made between rent and revenue. Though he does not say it in so many words, the drift of his argument is to press not only for an explicit official declaration that our land dues are revenue not rent, but for a practical application of the doctrine by levying a uniform percentage on "the economic rent." As there is not, in most parts of India, any separation between profits and rent, both being enjoyed by the same person, this tax would resolve itself into a uniform percentage on the produce. Several members of Council have written instructive Minutes upon Sir Louis Mallet's paper, but they mostly shrink from the general discussion to which he has invited them. Sir Henry Montgomery considers the discussion useless. Sir Erskine Perry looks upon it as a *speculation oisive*. Sir George Campbell considers it a question of words.

In this latter view Sir Henry Maine concurs, but does not on that ground regard the debate as idle, for, in his experience, questions of words have had a large influence on Indian policy.

I cannot see how the question can be described as one of words. The practical difference between the word rent and revenue is very palpable to the cultivator. Under the rent theory his payments are a portion of his gross produce, limited by the condition of his first paying his wages and profits; under the tax theory they are unlimited either way, save by the power or mercy of the Government. It speaks loudly for the character of British rule, that the advocates of the ryot call for the application of the tax theory. Under the Mogul they would have welcomed the rent theory as heartily as they would the tax theory now.

Nor can I regard it as a *question oisive*. The fiscal relations of the Government to the cultivator is a question which I should rather accuse of obtrusiveness than of indolence. We may, it is true, discuss it under different forms. We may use the terms of political economy, or we may use the less accurate but more flexible language of unscientific men. Sir Bartle Frere has shown how difficult it is to classify under two sharply defined headings a series of facts differing only by small degrees. One mode of describing them may be more convenient and more complete than another. But the essential point is that the language used should be understood by those to whom it is addressed. Now it is our function to address Indian officials, and—speaking of the generation now coming into office—their vocabulary is derived with more or less fidelity from the writings of political economists. They have been required to study the science closely before they could undertake our service, and their minds were fresh from a close application to it when, for the first time, they came into contact with Indian life, and were trusted with a share of Indian Government. To the modern Indian statesman the refined distinctions of the economical school are a solid living reality, from which he can as little separate his thoughts as from his mother tongue. To us it may seem indifferent whether we call a payment revenue or rent, so we get the money; but it is not indifferent by what name we call it in his hearing. If we say that it is rent, he will hold the Government in strictness entitled to all that

remains after wages and profits have been paid, and he will do what he can to hasten the advent of the day when the State shall no longer be kept by any weak compromises from the enjoyment of its undoubted rights. If we persuade him that it is revenue, he will note the vast disproportion of its incidence compared to that of other taxes, and his efforts will tend to remedy the inequality, and to lay upon other classes and interests a more equitable share of the fiscal burden.

I prefer the latter tendency to the former. So far as it is possible to change the Indian fiscal system, it is desirable that the cultivator should pay a smaller proportion of the whole national charge. It is not in itself a thrifty policy to draw the mass of revenue from the rural districts, where capital is scarce, sparing the towns, where it is often redundant and runs to waste in luxury. The injury is exaggerated in the case of India, where so much of the revenue is exported without a direct equivalent. As India must be bled, the lancet should be directed to the parts where the blood is congested, or at least sufficient, not to those which are already feeble from the want of it.

I agree, therefore, with Sir Louis Mallet in desiring that our present nondescript land dues should tend to the form of revenue rather than that of rent. But the question for present decision is whether, supposing we have all agreed in that wish, we should take any decisive step in furtherance of it. Sir Louis does not state precisely what measure or series of measures he would take. I presume it would be a fresh and more elaborate declaration of principle, followed by an instruction to limit all land payments to 50 per cent. on the gross produce, ascertained, presumably, by an average of past years.

There are, to my mind, two fatal objections to this course; the first is, that we cannot afford it; the second is, that we have not the power to secure its being followed out.

As to the first, I need not enlarge on the state of Indian finance. Our expenses grow annually, and almost the only part of our revenue which can be trusted to grow is that which comes from land. For many years to come we could not part with this increase without endangering our surplus. Nor can we look for any early succour from the effects of the remission itself. As far as we can judge by the experience of the past, relief from taxation applies no appreciable stimulus to the Indian producer. The recuperative force which plays so large a part in the calculations of Western financiers seems to be wholly wanting in the East. At the end of a long span of years our lost land revenue might begin "to fructify in the pockets of the people;" but what is the Exchequer to do in the meantime?

The other and more serious difficulty is, that we have not the power to give permanent force to a new policy. Can we enact that our successors shall do exactly that which we are not doing—forebear from altering their predecessors' work? Sir Louis Mallet notes a long series of inconsistencies in the course of the Indian Government. Have we any grounds for thinking they will cease? They are not merely subjects of reproach; they are a warning of the fashion after which our Indian Government is made. By the law of its existence it must be a government of incessant change. It is the despotism of a line of kings whose reigns are limited by climatic causes to five years. Whatever power exists in England is divided between a council of which the elements are necessarily fluctuating, and a political officer whose average existence amounts to about thirty months. It would be absurd to expect from this arrangement a persistent and systematic policy, if the policy is to depend on the will of the Government. We might indeed commence a new policy with some confidence, if the state of opinion in the service and among Anglo-Indians here was such as to give assurance that it would be sustained; but of that security there is no appearance. Any sharp change of measures would not be a natural development. It would be "*actroyé*" by the present Government, and would be at the mercy of any succeeding Government to set aside; and another link would be added to the chain of inconsistencies that would present themselves to future criticism.

We must be content to contribute our mite towards a gradual change. We can favour, as we have opportunity, leniency and regularity of assessment; we can discourage attempts to take advantage of inflated prices

we can avoid and disavow language belonging to the rent theory. In this, I think, we shall meet with sufficient support from existing Indian opinion to hope that our acts and language may be accepted as precedents by our successors. Sir George Campbell appears to dread this gentle mode of progression, which he denounces under the name of drifting. I cannot accept the metaphor in its entirety, for I believe that there is still left some, though not a very important, influence for the helm. But with this reservation, I see no terror in the prospect of "drifting." On the contrary, I believe that all the enduring institutions which human societies have attained have been reached, not of the set design and forethought of some group of statesmen, but by that unbidden and unconscious convergence of many thoughts and wills in successive generations to which, as it obeys no single guiding hand, we may give the name of "drifting." It is assuredly only in this way that a permanent solution of these difficult questions will be given to the vast communities of India. The vacillation of purpose, the chaos of opinion we are now deploring, only indicate that the requisite convergence has not yet been attained.

Certainly the English land tenure, which is in the minds of most Englishmen who argue about that of India, is a very remarkable achievement of the process of drifting. It assuredly has not been created by a definite policy. No one man or Council thought it out, put it on paper, and proclaimed it. It has been the work of many successive persons, who acted without conscious co-operation or continuity, and mostly thought they were doing something very different from that

which they actually did. It has grown partly out of an unmarked change in usages, partly out of measures adopted from time to time to meet temporary exigencies. Yet, whatever its merits or defects, it undoubtedly has these two qualities, that it is pretty firmly rooted, and it is consistent with a high degree of material prosperity. We have no right, therefore, to speak disrespectfully of drifting. It is as likely to conduct India to a safe issue as England.

In the draft to Madras, therefore, though it ought to be framed with the utmost consideration for Lord Hobart, I would abstain from any detailed discussion of general principles, nor would I give any corroboration to his premature declaration in favour of a fixed land-payment. At the same time, I think we may fairly discourage any scientific refinements in the work of assessment, which are a natural exercise of the intellect in highly cultivated officers, but which worry the ryot, distribute the burden of the State with needless inequality, and impose a costly machinery on the State.

26th April 1875.

SALISBURY.

Lord Hobart died the day after this paper was written. I circulate the various minutes because the subject is one that will probably recur; but for the present I should recommend a draft noting that half the Madras Council has been changed, and saying that we should be disinclined to enter upon the discussion of any proposed changes until the new Government should have had an opportunity of examining them.

29th April 1875.

S.

MINUTE BY SIR F. SKENE PERRY.

As the controversy whether the Madras Survey shall be discontinued has been conducted hitherto in writing, perhaps it may be well to put down on paper what I should otherwise state by word of mouth.

I wish then to remind my colleagues of the practical wisdom displayed by two old Indians of no mean note, Warren Hastings and Sir John M'Pherson, when the question which Sir Louis Mallet has resuscitated was first raised, more than a century ago. When the East India Company first began to collect the land revenue the usual difficulty as to where the proprietorship lay occurred; Sir Philip Francis, fresh from England, laid down unhesitatingly that it was vested in the zemindars. He also, quoting Adam Smith and other economists, enforced that the prosperity of the country could only be secured by imposing a fixed land tax. Warren Hastings, on the other hand, declined to give any decided opinion on a subject of which the English were so profoundly ignorant, and he recommended most strongly a careful inquiry into land tenures, either by a field survey or by examination of the village accounts. His (*pro tem.*) successor, Sir J. M'Pherson, advocated the same policy.

But Lord Cornwallis, who arrived from England in the following year, held that there was quite sufficient information before the Government, and he proceeded to enact the Permanent Settlement, which Niebuhr (perhaps with some exaggeration) pronounced to be the most disastrous, and, at the same time, the most benevolently intended measure ever devised by man. Speaking abstractedly, and without reference to India, I agree with the views of Lord Salisbury, that it is not expedient to take the whole rent from the land as Government revenue, and that a fixed land tax is a better institution. But we have to deal with India as we find it, and with Indian views as they prevail amongst the people. Sir Louis Mallet's anxiety to determine whether the land revenue is rent or tax appears to me to proceed on an erroneous application of the terms of political economy to a state of facts different from those out of which the terms arose.

Rent, according to the economists, is the difference of price between the value of the produce on the richest land and of that on the poorest which will pay the expenses of cultivation. It essentially depends on contract, and is fixed by the "bidding of the market." Rent in this form undoubtedly does not exist in India, except in a few exceptional cases, though an approximation to it may be observed in the ryotwari tenures of Madras. Rent, again, implies the exclusive ownership of land, by which the owner may either keep his land uncultivated or lease it to whom he pleases. This relation has never been known in India, and in fact, as

in nearly all the countries of the world, the tenure of land is peculiar to itself, just as it is in England, in France, in Germany, and elsewhere. Volumes have been filled with what I venture to term "*speculations oisives*" as to the ownership of the land in India, but they have not generally been written by practical men. Colonel Sykes was one of the chief champions. What the fact really is would seem to be that the undoubted right of the Government to take a proportionate share (a proportion to be determined by the will of the Government) of the produce of the land is acknowledged all over India, and the effect of this is to make the Government co-owner with the village, the bhoomia, the zemindar, or whomsoever else, claiming hereditary rights in the land.

Under the system which has now prevailed for some years, and which has been duly kept in sight ever since I have been on the Revenue Committee (14 years), Government has recognized the policy of making a moderate assessment, which shall leave the cultivator in position of a beneficial holding, and which shall enable him out of the extra profit in good years to pay his dues to Government in bad. It also claims the right to profit by the increasing prosperity of the country, if agricultural produce rises in price. All this approximates the land revenue much more to the character of rent than of tax.

Many speculators (Stuart Mill at the head) have greatly approved the dedication of all the rent of the country to the support of the Government, and no doubt there is much to be said for it, though I consider its economic effects in obstructing the production of wealth are pernicious. But the obvious fact is, that it exists in India, and, as Lord Salisbury clearly sees, it cannot easily be replaced. Advocates for the exclusive ownership of land, with such Government tax upon it as may be deemed just, point out that all European experience shows its operation in the production of wealthy classes who may be available for taxation, contributors to income taxes, customs, excise, &c. But apply this experience to India, and what is the result? We find a small (a very small) wealthy class there, but their habits are so simple, their wants so few, that taxation cannot reach them, neither customs nor excise affect them, and if we apply an income tax the wealthy Brahmin of Muttra or Benares, or the Seth of Gujerat or Marwar, removes the site of his firm to a native state.

The moral of all this is, let things go on as they are doing, but do not start any speculative theories to inflame the young civilians, fresh from Adam Smith and Ricardo, into crusades against a system which dates back 3,000 years.

15th May 1875.

F. PERRY.

MINUTE BY SIR H. MONTGOMERY.

I am very loath to prolong this discussion, but I must ask to say a few words with reference to Sir Louis Mallet's last Memorandum. I would observe, however, that in his first Memorandum he has misquoted Mr. Sim, who says exactly the reverse of what Sir Louis understands him to say of the Government, "as virtually the great landlord," and of the advantages of a sound settlement of the demands upon the land of which "they" are in fact proprietors. Now a glance at Mr. Sim's Minute will show that "they" refers to the coparceners or ryots, and not to the Government, as Sir Louis infers.

Sir Louis seems to maintain throughout his second Minute that the Government takes from the ryot, "not what it chooses," "but what it dares," and he remarks on augmentation of Government demands in Bombay and elsewhere.

I cannot admit that the Government are so voracious as he imagines. Large augmentations have occurred in the revision of the Bombay settlements about to expire, because of recent augmented cultivation. Land unoccupied and waste at the commencement of the previous expiring settlement of 30 years' duration has, during it, been brought into culture, and has now been consequently assessed.

In reviewing the reports of the Settlement Officers, the Government of Bombay have not failed to discourage high rates, and the final reviews of the Secretary of State prove how persistently moderation has been inculcated and sometimes enforced.

Perhaps the most prominent feature of the orders of the Home Government for the last half century has been the desire of creating, when not already existing, a proprietary right on the part of the ryot in the land he holds. I assert that the title to this proprietorship is as good and as strong as can be. So long as he pays the dues of Government he cannot be ousted, and any collector attempting to oust him on any other grounds than non-payment would be as certainly subject to prosecution, as he would be certain to be cast if prosecuted, in any of our courts of law.

tion, as he would be certain to be cast if prosecuted, in any of our courts of law.

A ryot's holding is saleable, and sales are common in every district; in many, land sells for 20 and 30 years' purchase, and is then considered by the Natives the safest and best of investments, in full confidence that the Government demand cannot be unduly raised. In Tanjore and Tinnevely mirasi right has existed from time immemorial, and has always been protected under our rule. In these districts every inch of land is recognized as private property, in its fullest meaning.

The Rajah Ameer Sing, the predecessor of Sirfojee, by whom he was superseded, was unwise enough suddenly to raise the customary Government share of the produce of the Tanjore country, taken in kind, from 50 to 75 per cent., and thus annihilated mirasi right and all valuable ownership in the land, and for a time he ruined the country. We are not likely to, and indeed "dare" not, attempt a repetition of such policy and the mirasidars well know this, and are confident and contented and well off under our rule.

The land revenue, being the source from which the necessary changes of administration are mainly met, must be maintained in its integrity for that purpose as it was handed down to us by our Native predecessors, but it must be moderate and equal as far as our efforts can make it so, the great object being kept in view of preserving proprietorship in the land where we found it, and of forming it where it is wanting. This is the aim of the Madras Revenue Survey and Assessment in progress, as authorized by the Court of Directors in 1853; about two thirds of it has been effected. To stop short at this moment, would be in the highest degree impolitic, if, indeed, it were possible. To carry on the work rapidly to satisfactory completion on its present basis is, in my humble opinion, the point to which the exertions of the Madras Government should be earnestly directed by the Secretary of State in Council.

17th May, 1875.

H. C. MONTGOMERY.

VIII.—GROWTH OF TAXATION IN MADRAS.

NOTE ON STATEMENT NO. I., SHOWING THE GROWTH OF REVENUE AND TAXATION, INCLUDING LOCAL AND MUNICIPAL, IN THE MADRAS PRESIDENCY FROM 1800-1801 TO 1877-78.

Between the year 1620, when the first trading establishment was settled at Masulipatam in Madras, and 1800-1801, when the information contained in Statement No. I. commences, various territories had been acquired at different dates, either by conquest, cession, or treaty, which finally constituted the Madras Presidency.

The area under British rule in 1800-1801 may be considered practically to be very nearly what it is at the present day. The only acquisitions of territory since that date, are, the district of Kurnool in 1838-39, comprising an area of about 7,000 square miles, containing an estimated population of 273,190 souls, and yielding a revenue of about 80,000*l.*; and Tranquebar, which was ceded by the Danes in 1845. Since this last date no accession of country has been made to the Presidency of Madras. But in 1862 the district of North Kanara, of about 4,000 square miles, with a population of 338,000 souls, and yielding a land revenue of 110,000*l.*, was transferred to the Presidency of Bombay. The total loss from all branches of revenue, by this transfer, was stated to be about 147,500*l.* (*vide* Administration Report of Madras, 1862-63).

The total area of the Madras Presidency under British administration at the present date, exclusive of the Native States, is stated to be 138,856 square miles, and the population, according to the census of 1871-72, is numbered at 31,597,872 souls.

Columns 2 to 12 in Statement No. I. show the State revenue or taxation, distinguishing the sources whence derived. For the years 1800-1801 to 1828-29, the receipts of land revenue, moturfa, excise, and tobacco monopoly (cols. 2, 3, 4, 5) are lumped together in the returns. In 1828-29 tobacco is first shown separately, and from 1835-36 all the above-named items are distinguished.

The miscellaneous revenue, shown in col. 11, comprises items not strictly of taxation; and for this reason

the revenue is totalled (cols. 10 and 18) exclusively of it. The chief items comprised under the head "Miscellaneous" were, in 1877-78.—

	£
Tributes and Contributions	344,643
Forest	40,434
Post Office	114,597
Law and Justice	124,192
Receipts in aid of Pensions, &c.	247,599
Army	178,778
Public works	45,624

Columns 13 to 17 show the taxation from other sources than those credited to state revenue. The origin of this taxation and the circumstances under which it has been levied are fully explained in a separate paper in connection with Statement No. II.

The different columns are totalled so as to show, as far as is practicable, the growth of each main head of revenue by decennial periods, and the average of each such decade.

The revenue and taxation (omitting "miscellaneous" items) in the period 1872-73 to 1877-78, amounted per head of population to—

	s.	d.
State revenue	4	4
Local and municipal	0	5½
Total	4	9½

The returns of population, exhibited in col. 20, prior to the census of 1871, are so untrustworthy, that little reliance can be placed on deductions from them. But, according to the estimate of 1822-23, the figures show that State revenue in that year amounted to 7*s.* 1*d.* per head of population.

NOTE ON STATEMENT NO. II., SHOWING THE VARIOUS KINDS OF LOCAL AND MUNICIPAL TAXATION IN THE MADRAS PRESIDENCY, FROM THE YEAR 1853-54 TO 1877-78 INCLUSIVE.

This statement is an expansion of columns 13 to 17 in Statement No. I., and shows the progress of local and municipal taxation in the Presidency of Madras.

Village Service Fund.—Prescriptive allowances to village officers (headman and accountants) are exhibited in column 2.

From the commencement of British rule it has been the usual practice to allow certain charges on the revenue of each village, for the remuneration of the village officers. Before 1853-54 these charges were not brought to account, either as receipts or as disbursements; they are now treated as regular cesses extra to the revenue, and brought to account accordingly. This column also includes assessments imposed on revenue free service lands for the remuneration of the officiating village officers.

Column 3 shows the amounts of service cess in lieu of direct fees of village officers. Besides the emoluments above described, village officers, revenue and police, have always had a prescriptive right to certain fees or other remuneration direct from the cultivators. Madras Act IV. of 1864 legalized the commutation of such direct levies into a cess of one anna in addition to each rupee of revenue ($6\frac{1}{2}$ per cent.), the direct levy being made illegal when such commutation had been effected. The extra cess began to be separately brought to account in 1871-72, but the Act has as yet been applied only to five districts, though it is intended eventually to extend its operation.

These Service cesses exist in Ryotwari villages only, the reorganization of village establishments not having yet been attempted in the Zemindari tracts.

For the years 1872-73 to 1876-77, the totals in column 4, it will be noticed, exceed the aggregate of the two previous columns. The explanation is that certain items (such as per centage on water rates) have been credited to the village service fund, which had not been shown separately in the accounts under either head.

It will be observed that the village service fund is not new taxation, having existed in another form since the introduction of British rule; and the gradual increase under column 2 since 1853-54 is apparent only, the system of bringing the cess to account having been introduced gradually.

It will also be noticed that these cesses, as well as that under column 5, depend on and vary with the amount of land revenue.

Local Funds General.—Local taxation for the improvement of communications was first legalized by Madras Act III. of 1866, which imposed a rate of half an anna per rupee, or $3\frac{1}{2}$ per cent. of the rent value of land (which, in the case of Ryotwari or lands held direct from Government, was to be taken to be equivalent to the Government assessment and water rate of the land), for the construction and maintenance of district roads. This Act was superseded by Madras Act IV. of 1871, which greatly developed the principle of local taxation and local administration.

This last Act constituted local boards, consisting of local and non-official members, for the administration of the local funds raised within each local fund circle, of which there are 35 in the Presidency. The local fund under the Act comprises, 1st, a rate on the rent value of land (column 5), as under Act III. of 1866, which was, however, raised to one anna in the rupee ($6\frac{1}{2}$ per cent.), two-thirds of which rate the Act appropriates to im-

provement of communications, and one-third to education and sanitation; 2ndly, a house tax (column 6) for educational purposes, the imposition of which was, however, optional to Government, and which, practically, is now in abeyance; 3rdly, tolls (column 7) on animals and vehicles using roads within the circle, tolls having previously been levied for the improvement of communications under other laws; 4thly, certain minor items not of the nature of taxation.

Special Local Funds.—Various sources of income applicable to local administrative purposes, and known as special funds, exist in this Presidency; of such are school and university fees, rent of travellers' bungalows, and the like. But three of these items may perhaps be considered of the nature of taxation, and are therefore shown in the statement to which this paper refers.

Column 9, *Pound Fund.*—This consists of the fines, on account of trespassing cattle sent to a pound, imposed under the Cattle Trespass Act I. of 1871. After providing for the necessary expenses, half the surplus is appropriated to the local or municipal funds, as the case may be, of the place where the pound is situated, and half to the agricultural school at Sydapet, for agricultural education.

Column 10, *Fishery Rents.*—The sums obtained for the right of fishing in certain tanks or streams have been, from 1863-64, appropriated to local communications. Since 1875-76, however, they have been credited to the Irrigation department, and no longer form a portion of local funds.

Column 11, *Jungle Conservancy.*—This is a light tax in the shape of fees on the wood collected for sale and the like, or the use of the communal or village woodlands. The proceeds are expended by the officers of Government upon raising roadside avenues, firewood plantations, and similar objects.

Municipal Taxation.—Column 13 gives the municipal taxation for the city of Madras under the several Acts which regulate its municipal administration, viz., Madras Acts, XIV. of 1866, IX. of 1865, V. of 1871, and V. of 1878. The population of the Presidency town is 397,500, by the census of 1871, and the rate per head of municipal taxation was thus, in 1877-78, about 2s. 10d. But the last Act, V. of 1878, has raised that rate by about one-fourth.

Column 14.—Municipal institutions and taxation were introduced in places other than the Presidency town by Act X. of 1865. The chief object of this Act was to impose on the various towns in which municipalities were constituted a contribution of 75 per cent. of the cost of their own police, while Government was to contribute a moiety of the municipal expenditure on sanitation. By Act III. of 1871, these municipalities were relieved of expenditure on sanitation, while primary education was added to the objects on which municipal funds may be spent. Under Act VII. of 1878, police has again been placed among the objects of municipal taxation, the exemption having occasioned embarrassment to provincial revenues.

There are altogether 48 municipalities (exclusive of the city of Madras), with an aggregate population of 1,198,000, the average rate per head of municipal taxation being, in 1877-78, about 1s. 3d. But there is room under the existing law for an improvement of municipal income, as the maximum rates have probably nowhere been imposed.

OFFICIAL YEARS.	STATE REVENUE OR TAXATION.									
	Land Revenue.	Moturfa or tax on Trades, Houses, &c.	Abkarti, Farms, and Excise.	Tobacco Monopoly in Malabar and Kanara.	Customs and Land transit.	Salt Receipts.	Stamps.*	Income, License, and Assessed taxes.	Total, excluding Miscel- laneous Cols. 2 to 9.	Miscel- laneous.
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1800-01		£ 2,458,777			£ 194,885	£ 19,352			£ 2,672,964	£ 567,304
1801-02		3,815,851			312,493	20,932			4,149,276	550,533
1802-03		4,014,204			349,227	31,797			4,395,228	529,676
1803-04		3,909,792			395,367	27,788			4,332,927	318,877
1804-05		3,989,892			544,107	39,771			4,573,770	323,370
1805-06		4,146,941			352,481	185,897			4,685,319	329,174
1806-07		3,803,506			256,061	215,848			4,275,415	327,306
1807-08		4,043,188			245,837	258,990			4,548,015	379,304
1808-09		4,047,014			298,946	262,803			4,608,763	359,538
1809-10		4,164,081			383,753	278,640	12,215		4,838,689	334,502
Average, 1st Decade		3,839,325			333,311	194,180	12,215		4,308,337	434,974
1810-11		3,988,023			423,170	339,610	28,679		4,779,482	450,094
1811-12		3,901,338			436,532	342,593	26,147		4,706,610	450,107
1812-13		3,966,047			453,720	370,643	29,196		4,824,606	466,521
1813-14		3,986,489			472,276	333,321	31,556		4,833,642	473,446
1814-15		3,889,555			541,286	313,388	38,880		4,783,059	339,105
1815-16		3,609,668			514,300	312,666	40,155		4,476,789	629,318
1816-17		3,826,107			519,067	295,716	38,168		4,679,068	681,162
1817-18		3,856,433			506,660	295,917	47,444		4,706,454	674,553
1818-19		3,799,410			507,716	356,680	46,507		4,710,313	651,119
1819-20		3,791,931			538,659	363,627	51,919		4,746,136	660,865
Average, 2nd Decade		3,861,500			491,839	332,416	37,860		4,723,615	563,559
1820-21		3,738,460			570,567	313,755	62,243		4,685,025	718,451
1821-22		3,708,404			630,769	364,087	64,744		4,768,004	760,025
1822-23		3,769,369			624,888	336,005	64,513		4,794,775	790,435
1823-24		3,741,100			573,793	356,330	62,340		4,733,583	765,202
1824-25		3,765,212			586,810	327,719	62,640		4,692,381	748,562
1825-26		3,978,682			557,609	359,397	61,504		4,957,182	757,733
1826-27		3,699,312			545,818	330,839	56,907		4,632,876	1,375,805
1827-28		3,605,226			566,729	346,192	56,260		4,674,407	773,431
1828-29		3,649,012		74,487	610,006	404,416	56,636		4,794,557	780,492
1829-30		3,522,100		71,208	590,726	469,630	52,870		4,706,434	709,133
Average, 3rd Decade		3,732,257			580,772	360,827	60,066		4,733,920	821,111
1830-31		3,460,329		60,503	581,516	443,864	48,610		4,600,822	757,438
1831-32		3,252,117		63,049	455,689	355,816	39,236		4,165,907	506,230
1832-33		2,940,703		65,177	419,072	333,360	38,673		3,796,985	341,076
1833-34		3,176,708		68,879	382,885	372,416	35,120		4,036,008	322,199
1834-35		3,256,855		68,913	420,130	376,408	40,001		4,162,307	317,718
1835-36	3,297,602	100,255	167,294	73,380	419,076	353,848	42,116		4,453,571	143,690
1836-37	2,893,849	96,908	170,733	75,531	469,445	372,892	45,466		4,124,824	493,455
1837-38	3,149,782	103,468	178,020	80,732	405,679	379,207	46,443		4,343,331	476,459
1838-39	3,237,301	104,759	184,657	82,334	407,206	402,953	48,201		4,467,411	485,659
1839-40	3,225,600	102,208	232,552	84,586	410,287	398,858	48,386		4,502,477	474,188
Average, 4th Decade	3,160,827	101,519	186,651	72,908	437,099	378,962	43,225		4,265,354	409,009
					3,406,078					
1840-41	3,279,035	102,482	188,433	82,744	427,635	378,052	49,982		4,508,413	466,226
1841-42	3,294,596	104,086	194,354	81,137	415,791	399,239	47,614		4,536,817	478,400
1842-43	3,274,072	109,610	209,733	94,842	427,672	399,761	47,546		4,563,236	523,523
1843-44	3,263,734	110,670	224,863	84,100	428,545	432,160	44,616		4,583,688	490,507
1844-45	3,378,188	112,845	227,952	85,144	200,166	452,560	36,456		4,493,311	503,018
1845-46	3,460,104	115,088	230,388	90,075	165,105	470,641	23,254		4,554,655	451,393
1846-47	3,589,910	111,472	219,525	88,585	151,040	455,635	24,812		4,640,979	493,065
1847-48	3,654,805	114,394	228,631	89,596	135,984	485,721	30,130		4,799,261	471,106
1848-49	3,645,695	112,942	243,157	71,388	92,876	450,797	36,824		4,673,679	477,775
1849-50	3,479,437	115,519	246,613	88,106	102,710	464,592	42,036		4,538,013	467,937
Average, 5th Decade	3,431,963	110,911	221,265	87,572	254,252	438,516	38,327		4,533,205	462,293
					3,849,710					

OR TAXATION FROM 1800-01 TO 1877-78.

OTHER THAN STATE REVENUE OR TAXATION.					GRAND TOTAL.		POPULATION against the years or date of latest information.	REMARKS.
Village Service Fund, Col. 4, Statement No. II.	Local Funds, General, Col. 8, Statement No. II.	Local Funds, Special, Col. 12, Statement No. II.	Municipal Taxation, Col. 15, Statement No. II.	Total, Columns 13 to 16.	Excluding Mis- cellaneous Cols. 10 & 17.	Including Mis- cellaneous Cols. 12 & 17.		
13.	14.	15.	16.	17.	18.	19.	20.	21.
					£	£		
					2,672,964	3,540,268		
					4,149,276	4,729,609		
					4,395,228	4,724,904		
					4,332,927	4,651,744		
					4,573,770	4,897,140		
					4,685,319	5,014,483		
					4,275,415	4,602,721		
					4,548,015	4,927,519		
					4,608,763	4,968,321		
					4,838,689	5,373,191		
					4,308,337	4,742,991		
					4,779,482	5,238,576		
					4,706,610	5,156,717		
					4,824,606	5,291,127		
					4,828,642	5,297,088		
					4,783,059	5,222,184		
					4,476,789	5,106,107		
					4,629,058	5,360,220		
					4,706,454	5,391,307		
					4,710,313	5,361,432		
					4,746,136	5,407,004		
					4,723,615	5,292,174		
					4,685,025	5,403,508		
					4,768,004	5,567,029		
					4,794,775	5,585,210	513,476,923	
					4,733,563	5,498,785		
					4,692,981	5,440,743		
					4,957,182	5,714,915		
					4,632,876	5,981,681		
					4,574,407	5,347,828		
					4,794,557	5,575,049		
					4,706,434	5,415,587		
					4,733,920	5,552,031		
					4,600,822	5,356,360		
					4,165,907	4,472,137		
					3,706,085	4,108,061	- - -	Famine year.
					4,086,008	4,358,207		
					4,162,307	4,480,025		
					4,453,571	4,599,261	513,967,395	
					4,124,824	4,618,309		
					4,343,331	4,819,890		
					4,467,411	4,953,070		
					4,502,477	4,976,615		Including Rs50,000 for the acqui- sition of Kurnool.
					4,265,354	4,674,384		
					4,508,413	4,974,639		
					4,536,817	5,015,217		
					4,563,236	5,086,769		
					4,583,688	5,074,105		
					4,493,311	4,998,329		
					4,554,655	5,006,048		
					4,640,979	5,134,044		
					4,739,261	5,210,367		
					4,673,679	5,161,464		
					4,538,013	5,005,950		
					4,583,205	5,065,500		

No. 1.—STATEMENT EXHIBITING THE GROWTH OF REVENUE

STATE REVENUE OR TAXATION.											
OFFICIAL YEARS.	Land Revenue.	Moturfa or tax on Trades, Houses, &c.	Abkarri, Farms, and Excise.	Tobacco Monopoly in Malabar and Kanara.	Customs and Land transit.	Salt Receipts.	Stamps.*	Income, License, and Assessed taxes.	Total excluding Miscellaneous Cols. 2 to 9.	Miscellaneous.	Total including Miscellaneous Cols. 10 & 11.
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
	£	£	£	£	£	£	£	£	£	£	£
1850-51	3,515,969	114,942	242,066	83,792	110,725	477,680	47,092		4,592,216	495,117	5,087,333
1851-52	3,610,646	119,257	241,840	89,677	115,680	483,427	49,888		4,710,415	522,817	5,233,232
1852-53	3,637,811	118,461	242,157	63,162	120,797	504,265	48,287		4,784,940	533,138	5,318,078
1853-54	3,492,335	110,236	249,086	8,958	126,528	480,214	52,819		4,430,176	557,459	4,987,635
1854-55	3,384,636	108,281	243,888		117,200	487,459	54,813		4,495,277	434,069	4,929,346
1855-56	3,414,611	101,889	231,594	Tobacco Duties were	180,714	507,734	66,855		4,453,937	533,932	5,287,329
1856-57	3,592,766	101,643	230,907	abolished	137,728	503,994	70,956		4,637,994	527,366	5,465,360
1857-58	3,673,862	107,326	275,410	under	141,174	572,597	75,540		4,850,909	527,366	5,678,275
1858-59	4,175,268	111,247	284,414	Act IV.	154,102	601,954	80,617		5,407,602	552,243	6,259,845
1859-60	4,093,345	109,242	292,647	of 1853.	255,577	647,115	93,041		5,490,967	1,060,013	6,550,980
Average, 6th Decade	3,655,625	110,252	253,351	61,397	141,022	526,639	63,941		4,785,389	694,349	5,479,738
	4,043,787										
1860-61	3,974,730	100,639	307,125		295,388	706,789	a 152,565	101,427	5,638,563	1,031,767	6,670,330
1861-62	4,153,293	The	333,466		232,522	868,323	b 310,458	284,958	6,183,020	832,059	7,015,079
1862-63	4,240,031	Moturfa tax	372,757		196,494	912,770	c 212,558	231,943	6,174,557	759,573	6,934,130
1863-64	4,299,792	was	405,165		229,852	899,272	238,342	164,960	6,237,383	791,896	7,029,279
1864-65	4,184,645	relinquished	396,054		203,878	1,036,670	269,409	147,867	6,238,523	768,076	7,006,599
1865-66	4,306,505	1st August	414,718		208,553	1,012,760	d 306,485	72,399	6,401,420	657,597	7,059,017
1866-67	3,652,026	1861 in	427,452		193,539	1,047,573	e 282,558	1,346	5,604,489	650,362	6,254,851
1867-68	4,244,396	favour of	506,491		251,902	1,098,802	f 353,725	88,695	6,544,011	968,866	7,512,877
1868-69	4,068,739	a License	490,843		276,591	1,107,253	372,347	63,581	6,379,404	1,127,677	7,507,081
1869-70	4,482,706	Tax.	570,022		276,485	1,164,736	g 406,482	135,423	7,085,854	1,043,778	8,079,632
Average, 7th Decade	4,160,691	100,639	422,409		236,521	985,495	290,492	129,260	6,243,732	863,165	7,106,897
	4,553,164										
1870-71	4,397,303		589,266		304,897	1,264,280	h 399,586	252,726	7,208,508	998,792	8,207,300
1871-72	4,440,313		570,892		318,228	1,307,841	399,025	110,817	7,142,116	950,311	8,092,427
1872-73	4,693,469		616,844		393,742	1,285,019	i 426,591	72,895	7,488,560	710,550	8,199,110
1873-74	4,451,489		609,946		336,152	1,295,186	471,469	4,380	7,188,622	1,021,925	8,210,547
1874-75	4,635,487		605,892		321,025	1,331,569	492,878	177	7,387,028	956,795	8,373,823
1875-76	4,545,013		633,901		307,962	1,353,789	501,971	60	7,342,696	1,017,792	8,360,488
1876-77	3,296,575		558,869		246,736	1,291,953	499,336	115	5,893,084	1,155,053	7,051,137
1877-78	3,454,884		471,069		203,350	1,142,186	489,221	14	5,800,724	1,185,714	6,986,438
Average 8 years	4,243,129		582,022		303,387	1,283,972	460,009	55,148	6,931,417	1,001,242	7,935,159
	4,826,401										

a Act XXXIV. of 1860.

b Act XXXII. of 1861.

c Act X. of 1862.

d Act IX. of 1865.

e Act XX. of 1866.

h Acts VII. and XX. of 1870.

i Acts VIII. and IX. of 1871.

NOTE.—The Blank spaces indicate that either the Item did

of TAXATION from 1800-01 to 1877-78—continued.

OTHER THAN STATE REVENUE OR TAXATION.					GRAND TOTAL.		POPULATION against the years or date of latest information.	REMARKS.
Village Service Fund, Col. 4, Statement No. II.	Local Funds, General, Col. 8, Statement No. II.	Local Funds, Special, Col. 12, Statement No. II.	Municipal Taxation, Col. 15, Statement No. II.	Total, Columns 13 to 16.	Excluding Mis- cellaneous Cols. 10 & 17.	Including Mis- cellaneous Cols. 12 & 17.		
13.	14.	15.	16.	17.	18.	19.	20.	21.
£	£	£	£	£	£	£	£	
					4,592,216	5,087,333		
					4,710,415	5,233,232	h22,031,897	
					4,784,940	5,318,078		
37,281				37,281	4,467,457	4,987,635		
37,006				37,006	4,582,283	4,929,346	h22,857,855	
43,290				43,290	4,436,687	5,287,329		
46,482				46,482	4,684,476	5,465,330		
42,783				42,783	4,893,692	5,878,275		
62,920			19,530	81,850	5,489,452	6,259,845		
62,960			17,013	79,973	5,570,940	6,550,980		
47,445			18,276	52,666	4,822,256	5,479,783	h24,656,509	
53,766			19,455	79,221	5,717,884	6,670,420		
55,446			19,494	74,940	6,257,960	7,015,079		
65,864			26,443	92,307	6,268,462	6,934,130	- - -	{ Excluding £147,500 for transfer of North Kanara to Bombay.
65,920	22,645	1,704	26,764	117,033	6,354,416	7,029,279		
50,074	27,440	28,501	27,740	133,755	6,372,278	7,006,599	h26,539,052	
64,530	32,063	36,007	29,910	162,510	6,563,930	7,059,017		
89,194	43,302	33,503	35,097	201,096	5,805,585	6,254,851	- - -	Year of 11 months only.
77,193	136,757	42,344	109,257	365,551	6,309,662	7,512,877		
92,348	218,712	43,498	113,720	468,278	6,847,682	7,507,081		
136,083	233,973	50,313	107,970	528,339	7,564,193	8,079,632		
75,612	102,128	33,696	51,585	222,303	6,466,035	7,106,898	h31,597,872	
158,236	210,620	50,754	110,860	529,970	7,738,478	8,207,300		
185,862	255,248	47,871	116,040	605,041	7,747,157	8,092,427		
196,750	397,433	52,218	122,937	769,338	8,257,898	8,199,110		
209,224	390,950	46,686	121,021	769,381	7,958,503	2,210,547		
210,620	403,955	48,767	111,927	775,269	8,162,297	8,373,826	h31,597,872	
226,955	336,966	57,675	120,952	792,548	8,135,244	8,360,488		
195,026	319,214	41,429	122,797	678,466	6,571,550	7,061,137	- - -	{ Famine years.
201,148	319,717	37,997	130,052	688,914	6,489,638	6,986,438	- - -	
197,980	335,513	48,175	119,516	701,178	7,632,596	7,935,169		

f Act XXVI. of 1867.

g Act XVIII. of 1869.

h See pp. 2, 3, and 9 of Census Report, 1871.

* Judicial Stamps, Fees, and Fines, &c., not being considered ordinary taxation, are not included in Col. 8, but under Miscellaneous.

not exist or that separate information is not obtainable.

MADRAS PRESIDENCY.

No. II.—STATEMENT SHOWING THE VARIOUS KINDS OF LOCAL AND MUNICIPAL TAXATION FROM THE YEAR 1853-54 TO 1877-78 INCLUSIVE.

OFFICIAL YEARS.	VILLAGE SERVICE FUND.			LOCAL FUNDS. GENERAL.				LOCAL FUNDS. SPECIAL.				MUNICIPAL.			GRAND TOTAL TAXATION, Columns 4, 8, 12, 15.	REMARKS.
	Prescriptive Allowances.	Service Cess in lieu of direct Fess.	Total Columns 2 + 3.	Rate on Rent Value of Land.	House Tax in Villages for Educational purposes.	Tolls and Fees.	Total Columns 5 + 6 + 7.	Pound Fund.	Fishery Rents.	Jungle conveyance.	Total Columns 9 + 10 + 11.	Taxation in the City of Madras.	Taxation of Provincial Municipalities.	Total Columns 13 + 14.		
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.
1853-54	37,281	-	37,281	-	-	-	-	-	-	-	-	-	-	-	37,281	
1854-55	37,006	-	37,006	-	-	-	-	-	-	-	-	-	-	-	37,006	
1855-56	43,290	-	43,290	-	-	-	-	-	-	-	-	-	-	-	43,290	
1856-57	46,482	-	46,482	-	-	-	-	-	-	-	-	-	-	-	46,482	
1857-58	42,783	-	42,783	-	-	-	-	-	-	-	-	-	-	-	42,783	
1858-59	62,320	-	62,320	-	-	-	-	-	-	-	-	-	-	-	62,320	
1859-60	62,960	-	62,960	-	-	-	-	-	-	-	-	-	-	-	62,960	
1860-61	59,766	-	59,766	-	-	-	-	-	-	-	-	-	-	-	59,766	
1861-62	55,446	-	55,446	-	-	-	-	-	-	-	-	-	-	-	55,446	
1862-63	65,864	-	65,864	-	-	-	-	-	-	-	-	-	-	-	65,864	
1863-64	65,920	-	65,920	-	-	-	-	-	-	-	-	-	-	-	65,920	
1864-65	50,074	-	50,074	-	-	-	-	-	-	-	-	-	-	-	50,074	
1865-66	64,580	-	64,580	-	-	-	-	-	-	-	-	-	-	-	64,580	
1866-67	89,194	-	89,194	-	-	-	-	-	-	-	-	-	-	-	89,194	
1867-68	77,193	-	77,193	-	-	-	-	-	-	-	-	-	-	-	77,193	
1868-69	92,348	-	92,348	-	-	-	-	-	-	-	-	-	-	-	92,348	
1869-70	136,083	-	136,083	-	-	-	-	-	-	-	-	-	-	-	136,083	
1870-71	158,236	-	158,236	-	-	-	-	-	-	-	-	-	-	-	158,236	
1871-72	147,343	38,539	185,882	234,572	33	90,642	255,248	22,150	9,622	16,089	47,871	44,053	71,987	116,040	605,041	
1872-73	141,421	41,053	196,750	369,907	5,402	22,124	397,433	22,798	11,685	17,735	52,218	41,656	81,301	122,937	769,338	
1873-74	137,691	43,673	209,254	384,458	3,803	22,689	390,950	20,938	11,059	16,689	48,686	40,192	80,829	131,021	769,881	
1874-75	141,989	53,091	210,630	371,309	7,454	25,192	403,955	22,062	10,546	16,159	48,767	40,690	71,237	111,927	775,269	
1875-76	134,372	54,081	226,955	360,324	131	25,521	386,966	22,537	9,981	25,157	57,675	45,238	75,714	120,952	792,548	
1876-77	123,312	52,024	195,036	298,704	-	20,510	319,314	23,632	†	17,797	41,429	48,883	73,914	122,797	678,465	Famine years.
1877-78	201,148	-	201,148	292,126	-	27,591	319,717	22,632	†	15,365	37,997	55,344	74,708	130,052	688,914	

* These figures do not make up the total of the previous Columns for reasons explained in the note which accompanies this statement.

† Transferred to Irrigation, Public Works Department.

NOTE ON STATEMENT NO. III. SHOWING THE EXTENSION OF THE OCCUPIED AREA OF LAND FULLY ASSESSED, AND THE GROWTH OF THE LAND REVENUE IN THE MADRAS PRESIDENCY SINCE 1852-53.

This statement cannot be carried back before 1852-53, as the detailed information in columns 3 to 16 inclusive does not exist in a complete form prior to that year.

Column 2 corresponds to column 2 of Statement No I. It shows the *actual realizations* of land revenue for each year, which are the same as the *current demand* for that year, column 5, *minus* any sums uncollected within the year, and *plus* collections of arrears of former years. This explains the discrepancies between columns 2 and 5.

Column 3 shows the fixed land revenue demand on the zemindari or permanently settled estates, assessed at a lump sum on each estate. The total area of these estates is about 21 million acres, but the area of cultivation within them not being known, they are excluded from columns 6 to 16 inclusive.

When zemindari lands receive water from Government works of irrigation they pay water rate in addition to their fixed assessment. This water rate now amounts to from 70,000*l.* to 80,000*l.* a year, and is included in columns 4, 12, and 15, as it is not distinguished in the accounts from water rates on land not permanently settled.

Column 4 comprises all items of land revenue demand other than the fixed assessment of zemindari estates. The principal item is that of the revenue of lands held at full assessments direct from Government or Ryotwari lands (columns 7 and 10); the other items are water-rates, &c (columns 12 and 13), quit-rents on lands and villages partially exempt from assessment (in area about 7½ million acres), about 187,000*l.*; and numerous minor items, such as sales of grazing on Government waste lands and the like, known as land revenue "miscellaneous," about 30,000*l.*

Columns 6 to 16 give the details of the lands held subject to full rates of assessment on Ryotwari settlement or direct from Government. North and South Kanara are excluded from these columns, as the areas of cultivation in these districts are not shown in the revenue returns, and also, for the same reason, the district of Malabar prior to 1865-66.

These lands are distinguished according to the main classification in use under the Madras revenue system, viz. into lands *assessed* as unirrigated (columns 6 to 8), and land *assessed* as irrigated (columns 9 to 11).

This classification, however, needs some explanation.

First Lands irrigated by works which are private property (as, for instance, wells constructed by the landholder) are assessed at unirrigated rates, and are consequently entered in column 6.

Secondly. In order to exhibit the direct return from certain large irrigation works constructed by Government, the charge for water supplied from them is in the returns shown as a water-rate (column 12) separately from the land assessment, and the lands irrigated are shown as assessed at dry rates, and have been entered under column 6. The principal of these works are those on the rivers Godavari and Kistna, and the areas of land classed as "dry" irrigated from them were in 1878 about 540,000 and 265,000 acres respectively.

From the above it will be seen that the area actually irrigable bears a much larger proportion to the total area of fully assessed occupied land than would appear from the proportion of the area classed as irrigated (column 9) to the total area (column 14).

And it must be observed that the areas given, columns

6, 9, 14, are of holdings, not of cultivation, of fully assessed lands. In ordinary years, about 88 per cent. of the area held on Ryotwari settlement is under the plough, and 12 per cent. fallow or pasture.

Columns 7 and 10 show the regular ordinary assessment of the two classes of fully assessed lands, and columns 8 and 11 the average rate per acre of that assessment. But, under certain circumstances, an extra charge on account of the use of water may be made either on dry lands, water-rate (column 12) as explained above, or on wet lands, an extra charge when a second crop is grown (column 13), because the ordinary "consolidated" assessment (so called as including both soil and water-rate) is calculated for one crop only.

Columns 14 to 16 show the total area, assessment, and rate of fully assessed lands; but these columns also need some explanation.

Prior to 1865-66 the returns showed separately from the main classes of "dry" and "wet" certain other classes of fully assessed lands, amounting altogether to 350,000 or 400,000 acres. The principal of these minor classes were "garden," or lands irrigated by wells. In 1865 lands watered by private wells were relieved of any impost beyond the "dry" rate and all lands were classified as either "dry" or "wet." This accounts for the area in column 14 showing more than the aggregate of columns 6 and 9 in the earlier years.

It has already been explained that the water-rate on zemindari lands irrigated by Government works is included in column 12. The total assessment, column 15, of Ryotwari holdings is thus shown as higher by 70,000*l.* or 80,000*l.* a year (the amount of the zemindari water-rate) than it really is, and the average rate of assessment (column 16) is also proportionately too high.

The general results obtained from the statement to which this paper refers may thus be summarized. Comparing the averages of the first with those of the last quinquennial period (which includes the two years of famine), the increase of realizations of land revenue generally has been 588,257*l.*, or about 17 per cent. Taking the figures for the fully assessed Ryotwari lands only (column 15), and omitting the increase due to the inclusion of Malabar in 1865-66, the assessment has risen by 731,942*l.*, or 25 per cent, and the occupied area by not less than 7,215,898 acres, or 60 per cent.

The causes of the decrease in average rates are partly special reductions of assessment from time to time (some of which are noted in the column of remarks); partly the gradual introduction of the revised settlements, which has been going on since 1856, and has now extended to twelve districts; and partly the extension of cultivation to poorer and more lightly assessed soils. The absolute decrease is from about 5*s.* per acre to about 3*s.* 10½*d.*, or 23 per cent. The relative decrease, if the rise in prices is taken into consideration, is, of course, greater.

On dry lands the occupied area has increased by 6,654,847 acres, or about 72 per cent, the assessment by 448,801, or 37 per cent, the rate having fallen from 2*s.* 7½*d.* to 2*s.* 1½*d.* On wet lands there is nominally an increase in area of 903,371 acres, or 36 per cent, the rate having fallen from 13*s.* 1*d.* to 8*s.* 11½*d.* The real increase of irrigation is, however, not adequately exhibited by these figures, as is shown by the great increase in water-rates, 243,332*l.*, or more than 300 per cent., and in the charge for second crops, 11,197*l.*, or about 18 per cent.

MADRAS

No. III.—STATEMENT EXHIBITING THE GROWTH OF THE LAND REVENUE AND

OFFICIAL YEARS.	LAND REVENUE realised, according to the FINANCIAL STATEMENTS presented to Parliament.	CURRENT LAND REVENUE DEMAND as given in the ANNUAL REVENUE RETURNS, including KANARA and MALABAR.			TOTAL CULTIVATORS HOLDINGS of fully Assessed according to the Annual Revenue Returns; excluding		
		Revenue of Zemindari or permanently Settled Lands.	Revenue not permanently settled, including Miscellaneous, Water Rates, &c. *	Total Columns 3 + 4.	Dry or Unirrigated Lands		
					Area.	Assessment.	Rate of Assessment per Acre.
1.	2.	3	4.	5.	6.	7.	8.
	£	£	£	£	Acres.	£	£ s d.
1852-53 - -	3,687,811	498,251	3,205,721	3,703,972	9,266,425	1,225,712	0 2 7½
1853-54 - -	3,402,335	497,405	2,919,527	3,416,932	8,824,498	1,169,710	0 2 7½
1854-55 - -	3,384,636	497,948	3,072,251	3,570,199	8,250,015	1,122,015	0 2 8½
1855-56 - -	3,414,611	497,603	3,222,802	3,720,405	9,477,455	1,233,863	0 2 7
1856-57 - -	3,592,766	497,482	3,353,819	3,851,301	9,894,644	1,275,519	0 2 6¾
1857-58 - -	3,678,862	497,902	3,256,112	3,757,014	10,176,108	1,292,982	0 2 6½
1858-59 - -	4,175,268	497,750	3,615,486	4,113,236	10,697,180	1,338,126	0 2 6
1859-60 - -	4,083,345	506,341	3,533,465	4,039,806	11,304,510	1,391,329	0 2 5½
1860-61 - -	3,974,730	510,545	3,504,062	4,014,607	11,600,103	1,384,009	0 2 4½
1861-62 - -	4,084,040	510,996	3,718,651	4,229,047	12,224,006	1,431,240	0 2 4
1862-63 - -	4,206,040	510,148	3,776,029	4,286,177	12,821,125	1,454,471	0 2 0½
1863-64 - -	4,299,792	512,948	3,829,173	4,342,121	13,111,153	1,458,815	0 2 2½
1864-65 - -	4,184,645	512,166	3,739,969	4,252,135	13,659,063	1,504,244	0 2 2½
1865-66 - -	4,306,505	513,324	3,800,277	4,313,601	14,459,368	1,507,626	0 2 2½
1866-67 - -	3,652,026	512,662	3,898,240	4,410,902	14,940,073	1,625,491	0 2 2
1867-68 - -	4,244,396	513,285	3,684,908	4,198,193	15,437,351	1,678,442	0 2 2
1868-69 - -	4,088,789	514,652	3,792,846	4,307,498	15,640,120	1,692,944	0 2 1¾
1869-70 - -	4,482,706	514,275	3,998,127	4,512,402	16,003,033	1,726,049	0 2 1½
1870-71 - -	4,397,803	514,364	4,090,366	4,604,730	16,341,658	1,747,266	0 2 1½
1871-72 - -	4,440,313	512,946	3,937,636	4,450,632	16,084,145	1,709,999	0 2 1½
1872-73 - -	4,693,469	511,683	4,038,879	4,550,512	16,097,139	1,689,679	0 2 1
1873-74 - -	4,451,489	511,508	3,908,723	4,420,231	15,952,144	1,682,945	0 2 1½
1874-75 - -	4,635,487	513,299	4,135,728	4,649,027	16,232,415	1,713,100	0 2 1½
1875-76 - -	4,545,913	513,887	3,903,255	4,417,142	16,278,655	1,724,216	0 2 1½
1876-77 - -	3,296,575	513,824	3,141,394	3,655,218	16,217,256	1,727,427	0 2 1½
1877-78 - -	3,494,884	514,003	3,959,035	4,473,038	16,175,052	1,714,808	0 2 1½

* Quit-rents on lands partially exempt from assessment are also included in this column.

PRESIDENCY.

THE EXTENSION OF OCCUPIED AREA OF LAND FULLY ASSESSED SINCE 1852-3.

LANDS IN RYOTWARI TRACTS (Column 3), showing their Area in Acres, and Assessment thereon, the Districts of North and South Kanara in each year, but including the District of Malabar after 1865-66.								REMARKS.
Wet or Irrigated Lands under Consolidated Assessment.			Extra Assessment or Additional Revenue.		Total Holdings in Ryotwari Tracts.			
Area.	Assessment.	Rate of Assessment per Acre.	Water Rate and charge for Lands converted from Dry to Wet. †	Charge for Second Crop on Wet Lands. †	Area. Columns, 6 + 9.	Assessment Columns, 7, 10, 12, 13.	Rate of Assessment per Acre.	
9.	10.	11.	12.	13.	14.	15.	16.	17.
Acres.	£	£ s. d.	£	£	Acres.	£	£ s. d.	
2,269,030	1,435,074	0 13 1	No information.		‡12,078,535	‡3,022,422	0 5 0	Very disastrous year. Assessments provisionally reduced in nine districts to the extent of 113,749†
2,183,186	1,519,790	0 13 11			‡11,559,021	‡3,001,021	0 5 2½	
2,686,425	1,777,728	0 13 2½			10,936,440	2,899,743	0 5 2½	
2,727,858	1,698,520	0 12 5½			12,205,313	3,040,470	0 4 11½	
2,442,306	1,504,271	0 12 3½	73,629	59,665	‡12,964,668	2,913,084	0 4 6	Ulangu method of adjusting the commutation prices of grain in Tanjore and Tinnevely abandoned for regular settlement.
2,406,331	1,549,015	0 12 10½	69,125	43,557	‡12,941,030	2,954,679	0 4 6¾	
2,599,939	1,696,074	0 13 0½	70,440	80,689	‡13,629,430	3,185,329	0 4 8	
2,702,142	1,481,155	0 10 11½	99,143	79,570	‡14,389,214	3,051,197	0 4 2½	
2,682,302	1,441,795	0 10 9	106,447	51,490	‡14,669,960	2,983,741	0 4 0¾	North Kanara transferred to Bombay; revenue demand 110,000†; cultivated area not known.
2,802,775	1,519,102	0 10 10	102,925	59,273	‡15,420,153	3,112,549	0 4 0¾	
2,974,919	1,546,798	0 10 4¾	144,089	67,080	‡16,196,929	3,212,438	0 3 11½	
2,949,892	1,511,709	0 10 2¾	157,482	66,639	‡16,461,419	3,194,645	0 3 10½	
2,924,044	1,482,001	0 10 1½	165,833	50,874	‡16,778,662	3,202,952	0 3 9¾	Rates of assessment reduced in Trichinopoly and lands watered from wells relieved of special water-rate. Area and assessment for Malabar first shown in the accounts in this year. Dry 373,650 acres, assessment 58,340†, and wet 379,348 acres, assessment 37,932†; distinction of garden and other minor classification of lands disappear in the accounts from this date.
3,399,763	1,662,075	0 9 10½	209,104	53,895	17,859,131	3,532,700	0 3 11½	
3,574,520	1,730,160	0 9 8½	206,782	50,452	18,514,593	3,612,885	0 3 10¾	
3,563,259	1,728,642	0 9 8½	208,744	47,673	19,005,610	3,663,501	0 3 10¼	
3,572,745	1,723,622	0 9 7¾	213,382	53,229	19,212,865	3,683,177	0 3 10	Unfavourable year.
3,609,345	1,723,626	0 9 6½	229,700	55,094	19,612,378	3,735,369	0 3 9½	
3,646,029	1,734,297	0 9 6½	253,056	64,423	19,987,687	3,799,042	0 3 9½	
3,601,793	1,692,743	0 9 4½	270,557	57,702	19,685,938	3,731,001	0 3 9½	
3,594,274	1,668,761	0 9 3½	284,985	67,515	19,691,413	3,710,940	0 3 9	Famine years. Large remissions or suspensions of Revenue demands in consequence.
3,680,292	1,685,348	0 9 1¾	306,580	72,023	19,632,436	3,746,896	0 3 10	
3,725,599	1,697,476	0 9 1½	351,412	91,637	19,953,014	3,853,625	0 3 10¼	
3,742,731	1,702,258	0 9 1¼	313,262	55,910	20,021,886	3,795,676	0 3 9½	
3,739,600	1,693,709	0 9 0½	286,238	49,616	19,956,856	3,756,990	0 3 9	
3,834,563	1,719,979	0 8 11½	336,090	93,782	20,009,615	3,864,659	0 3 10¼	

† The figures under these columns, 12, 13, are included in those given in column 4.

‡ In these years the totals are more than columns 6 and 9 added together, as they include certain lands bearing assessment, but not then classed under either of the main heads "Dry" or "Wet."

NOTE ON STATEMENT NO. IV., SHOWING THE GROWTH OF SEA-BORNE TRADE OF THE MADRAS PRESIDENCY IN CONNECTION WITH RECEIPTS DERIVED FROM CUSTOMS DUTIES; AND OF RECEIPTS FROM, AND QUANTITIES SOLD, WITH THE RATE OF SALE, OF SALT; FROM 1800-01 TO 1877-78.

Customs and Land Transit Duties—The figures in Column 2 correspond with those in Column 6 in Statement No. I., having been taken from the Financial Accounts presented to Parliament. From 1800-1801 to 1844-45 the duties derived from land transit are not shown separately from those levied on the import and export trade of the Presidency, whether by sea or passing from British to foreign territory, and *vice versa*. Act VI. of 1844 abolished the land transit duties, and a new customs tariff was introduced. Since 1844 and up to the present date, the customs tariff has undergone constant revision. The inland customs duties, amounting to about 10,000*l.*, are included with the duties collected on the sea-borne trade

Sea-borne Trade.—The total value of foreign and coasting trade, shown in Columns 3, 4, and 5, has been extracted from the Commercial Returns of each year, from the earliest date for which such records exist. The information, however, in the original returns was given in different kinds of rupees, but notes are inserted in the column of remarks (9), explaining the rates at which they have been converted into sterling value for the different periods. No just conclusions can be arrived at as to the relations between the value of the trade and the duties shown in Column 2 for the earlier years, for reasons already assigned, *i.e.*, because the figures include the duties derived from land transit. Since 1844-45 a rapid and gradual increase in the value of trade is to be noticed. The average receipts from customs duties for the five years 1845-46 to 1849-50 inclusive, as compared with the last quinquennial period of 1873-74 to 1877-78, had increased from 129,543*l.* to 283,045*l.*, while the value of the sea-borne trade had risen from 4,701,153*l.* to 23,839,891*l.*, and the percentage of duties bearing on the trade during the same quinquennial periods would thus appear to be 2·75 per cent. in the first and 1·10 per cent. in the second instance.

During the 33 years, 1845-46 to 1877-78, the value of the foreign trade had increased from 2,499,193*l.* to 9,487,036*l.*, or about 279 per cent. The increase in the coasting trade from 2,232,101*l.* to 19,283,170*l.* is yet more noticeable, as it has taken place, notwithstanding the competition of railways, and as indicating a great development of commercial enterprise.

Salt.—A Government monopoly was established in 1805 for the administration of this source of revenue or taxation. According to the system still prevailing on the Eastern Coast, salt is made by private manufacturers, under advances from the Government, who are the sole purchasers. The salt is then resold at the price paid to the manufacturers *plus* the duty. But in Malabar and Canara, on the Western Coast, the monopoly has been done away with, and the salt is imported into these districts upon the payment of duty.

The figures given in Column 6 of the Statement to which this paper refers also correspond with those shown in Column 7 of Statement No. I., but the particulars in Columns 7 and 8 have been taken from the Report of the Madras Salt Commission. The receipts derived from salt show a gradual increase in the averages of each decennial period from 134,180*l.* to 1,283,971*l.*, or about 144,224*l.* for each period of ten years. Comparing four years, 1810-11 to 1813-14, with 1874-75 to 1877-78, the following result is obtained. —

	Receipts.	Sale Rate per Maund, including Duty.	Quantities sold.
	£	R. A.	Lbs.
Average, 1810-11 to 1813-14 -	346,542	0 14	366,655,200
Average, 1874-75 to 1877-78 -	1,279,852	2 4	543,906,320
Increase - {	933,310	1 6	177,251,120
	269 per cent.	157 per c.	48 per cent.

The duty on salt was raised from Re. 1. 13 to Rs 2. 8 in 1878

In their concluding remarks (Chap. XI., p. 223), the Madras Salt Commission calculate the annual consumption of salt within the limits of their Presidency, including Mysore and Coorg, to be 11·38 lbs. per head.

MEMORANDUM, BY MR. PEDDER.

It is understood that the points on which some explanation is desired are the increase of receipts in Col. 4, Land Revenue, and Col. 6, Taxes, of the Statement at page 146 of the Statistical Abstract for 1879.

2 As regards Col. 4, Land Revenue, there are two questions, (a) the cause of the increase in 1879 over the receipts of the two preceding years; (b) that of the general progressive increase from 12.48l. mill. in 1840 to 22.83l. mill. in 1879.

3, (a) is easily explained. The increase is due chiefly to recovery from the effects of the famine. The average realisations in the four years 1873-76 were 21.91l. mill. In the succeeding two years, of famine, the average realisations fell to 20.57l. mill. or 1.34l. mill. less than the previous average. Part of this decrease was dead loss, in remissions or in the assessment of lands resigned by their holders, but part was due to suspension of collections, and of these arrears it was estimated that 0.80l. mill. are recoverable in 1879, in addition to the normal revenue. Thus—

£
21.91 mill. average collections,
80 „ arrears,
22.71 „

brings the figures within 12l. mill. of the 22.83l. mill. estimated receipts for 1879. Of this small difference 0.3l. mill. is due to transfer in accounts from the head of provincial rates, and 0.9l. mill. to the usual growth of revenue.

4. The causes of (b) the general growth of land revenue are complicated, and can be stated only in general terms

I. In the first place, between 1840 and 1865, 242,000 square miles of territory were added, by conquest, lapse, or annexation, to the area, 621,000 square miles, of British India in the former year. The land revenue of the territory thus added, which includes the whole or great part of the important provinces of the Punjab, Oudh, the Central Provinces, British Burmah, and Sind, now amounts to about 6.14l. mill. And of the 9.43l. mill. by which the land revenue (taking it at its average of 21.91l. mill.) now exceeds the land revenue of 1840, 6.14l. mill. are thus due to increase of area, and only 3.29l. mill. to growth of revenue on the original area.

5. II. The latter increase is about 26 per cent. on the whole land revenue existing in 1840, but excluding Bengal, where, owing to the permanent settlement, the increase on the land revenue (3.64l. mill.) has been trifling, is about 38 per cent. To what causes is it due?

6. An increase of Indian land revenue may arise from one or more of three causes —

1. Increase in the area of assessable land, i.e., extension of cultivation.

2. Increase in the value of the produce of land already paying assessment, so that the same, or a smaller, proportion of that produce yields a larger revenue.

3. Increase in the proportion of the produce taken as assessment.

It will be seen that the increase which has occurred is due chiefly to the first, partly to the second, and in no degree to the third, of these causes.

7. The general extension of cultivation in India during the past 40 years it would be difficult to ascertain precisely, for many reasons, the chief of which is that, till regular surveys were made, areas were commonly stated in local and varying measures. But it has been ascertained that in very numerous localities in different parts of India the increase has been from 50 per cent. to 100 per cent., and it is believed that 50 per cent. is not much too high an estimate for the total extension.

8. The general prices of agricultural produce also (the natural result of the enormous absorption of treasure by India, 316 mill. in the 39 years, 1840 to 1879) have greatly risen. The price of rice in Calcutta, for example, rose upon the average of the five years 1843-48, and that of the five years 1872-77, in the proportion of 4 1/2; that of wheat in Bombay, upon the averages of the same periods, in the proportion of 4 1/2.

9. These general considerations support the view in paragraph 6 above. Before adducing, in further illustration of it, the facts of different provinces, it must be premised that, excluding the permanently settled tracts, the assessment of the Indian land revenue is based on two different principles, that of the settlements of Madras and Bombay, where, the cultivators generally holding direct from the State, Government fix for terms of years assessments on their lands, and that of the settlements of Upper India, where the assessment is avowedly a proportion of the rental receivable by the owner, similarly fixed for a term of years.

10. In Madras, the original native theory of assessment was that about half the gross produce was the State share. This enormous charge was gradually lowered under British rule, at first by early general revisions of assessments, the settlements of Sir T. Munro and others, then by actual and considerable reductions made from time to time in the cash rates to meet a fall in the prices of produce; and latterly from a rise of prices causing the cash rates to represent a smaller proportion of the produce. And, on the introduction of the new settlements (which has been going on for the last 20 years), the cash rate is fixed at half of the estimated net produce, i.e., of what remains to the cultivator after paying expenses of cultivation, including his own wage. Under this process cultivation and revenue have been steadily rising, and the rate of assessment sinking, as is shown by the following table, in which (for the ryotwari tracts only, about four sevenths the area of the Presidency) cultivation and revenue for 1852-53, the first year for which complete figures are attainable, and 1875-76 the year before the famine, are shown:—

		Total Cultivated Area of fully assessed Land	Total realised Land Revenue.	Average Rate of Assessment per Acre.	
				On Dry Land.	On Irrigated Land.
		Acres	£	R. A P.	R. A. P.
1852-53	“	9,780,000	2,502,000	1 3 11	7 0 11
1875-76	“	20,021,000	3,426,000	1 0 11	4 8 11

This statement alone, it will be observed, accounts for about a million out of the 3 1/2 millions increase referred to in paragraphs 4 and 5.

11. In Bombay, the cash assessments originally represented one-third or one-fourth the gross produce. The original regular settlements, made about 1840-50,

very largely reduced those rates, and during the term of the settlements, 30 years, the pressure of the rates was further reduced by the rise of prices. On the expiry of the settlements, the rates have been again enhanced, but not to anything like their original amount.

Realisations of land revenue in the Bombay Presidency (exclusive of Sind, Satara, North Kanara, and other territories added to it since 1840) were about—

In 1840-41 - - - - £1,458,000
 „ 1875-76 - - - - 2,330,000

About '87 mill. of the increase of 3'29 mill. under consideration is thus accounted for. The cultivated area for the former year cannot be stated. But the comparative figures for 1856-57, the first year for which complete figures are attainable, and 1875-76, are as follows:—

	Total Cultivated Area of Fully Assessed Land.	Total realized Land Revenue.	Average Rate of Assessment per Acre. ¹		
	Acre.	£	R.	A.	P.
1856-57	12,550,000	1,674,000	1	5	4
1875-76	20,340,000	2,330,000	1	2	4

The figures show that while cultivation has increased

in the proportion of nearly 3, revenue in that of nearly 2, since 1856, the average rate of assessment has been lowered in the proportion of 2, independently of the change in its incidence due to the rise of prices.

This, however, by no means represents the total decrease in the rate of assessment and extension of cultivation since 1840. For it must be remembered that between 1840 and 1856 were made most of the original settlements which so freely reduced assessments, and caused so great an immediate expansion of cultivation. In illustration of this, the figures in the Table below, ascertained in 1874 for eight talukas of the Deccan, may be cited. It must be remembered that these talukas are much below the average in fertility and assessment.

The cultivated area, before the introduction of the original settlement, averaged about 950,000 acres. By the end of the settlement it had increased to 1,805,000 acres. The realizations of land revenue, before the settlement averaged about 65,000£; by the end of the settlement they had risen to nearly 78,000£. It will thus be seen that, putting alteration of prices out of

	Average Price of Produce, Seers per Rupee.	Estimated Value of Produce per Acre.	Average Rate of Assessment per Acre.	Per-centage of Assessment to Produce.
		R. A. P.	R. A. P.	
Seven years before Original Settlement (1830-37)	43	4 13 5	1 0 6*	$\frac{22\frac{17}{100}}{100}$
First 10 years of Original Settlement (1837-48)	56½	3 8 7	0 8 4†	$\frac{14\frac{70}{100}}{100}$
Last 5 years of Original Settlement (1862-67)	18	11 1 9	0 7 5‡	$\frac{4\frac{17}{100}}{100}$
Five years of Revised Settlement (1870-75)	27½	7 5 5	0 11 9§	$\frac{10}{100}$

* Nominal or Assessed Rate. The rate on the revenue collected was about Rs. 0. 11. 0. per acre.

† and ‡ The difference between these two average rates is caused by extension of cultivation to more lightly assessed lands.

§ This rate was reduced after 1875 to about 10 annas per acre.

the question, an increase of revenue of 13,000£, or 20 per cent., was coincident with a decrease in assessment of over 50 per cent. If, however, changes in prices are taken into consideration, the proportion of assessment to produce fell from nearly one-fourth to less than one-twentieth. The revised rate, as finally fixed, averages about 10 annas, and consequently (assuming that the prices of produce will average 30 seers the rupee during the term of the revised settlement, as was anticipated when it was fixed) the rate is absolutely about one-tenth, relatively to the price of produce about six-elevenths, lower than the rate actually realized before 1840, while its yield is about 92,000£ against 65,000£.

12. The above, it is hoped, will show that in Madras and Bombay the increase of land revenue since 1840 is due entirely to the first of the three causes stated in para 6, viz., extension of cultivation, and was coincident with a moderate decrease of the absolute rate of assessment, and a considerable decrease of the rate relative to prices.

13 North-West Provinces.—In these provinces, as stated in para. 9, the land revenue is a proportion of the rental of each estate. That rental may, of course, rise from a variety of causes.

- From extension of cultivation, i.e., from waste lands in the estate being reclaimed and beginning to pay rent.
- From the rise of the rent of lands already cultivated which accompanies the extension of cultivation to waste lands.
- From a general rise of prices of produce.
- From increased value given to particular lands by new railways, roads, works of irrigation, &c.

These causes have all been in operation in the North-West Provinces. An estimate of the increase of the rental of these provinces during the past 40 years is not readily available. But it probably nearly corresponds to that of Bengal, which has trebled since the date of

the permanent settlement, having been then at the outside, 4'64l. mill., and now exceeding 13l. mill.

Before the original regular settlements of the North-West Provinces, the landowner was supposed to retain only 10 per cent. or 15 per cent. of his rental, the assessment taking 85 per cent. or 90 per cent. Under the regular settlements (made about 1833-43), the proportion of the assessment was reduced to two-thirds (66 per cent.), and the owners enjoyed all increment of rents during the term, 30 years, of the settlement. On the revision of settlement, the proportion of assessment has again been reduced to half, 50 per cent. But notwithstanding this great decrease in the relative rate of demand, the assessment has increased as below, since 1848-9, the first year for which detailed figures are available. The divisions of Delhi and Jhansi (one transferred from the other to, the North-West Provinces since 1848) are omitted.—

1848-49 - - - £ 3 68 mill.
 1875-76 - - - 4 02 mill.

This accounts for 34l. mill. of the increase.

14. Of the 3'29l. mill. increase in land revenue between 1840 and 1879, over 2'13l. mill. have thus been fully accounted for in the regular land revenue of Madras, Bombay, and the North-West Provinces. The balance, 1'16l. mill., is to be accounted for partly from the growth of land revenue in districts not included in 1840 in the above provinces (in Bengal for instance, it appears to have been about 20l. mill.); partly from the increase of land revenue in Madras and the North-West Provinces in the years between 1840 and 1852 and 1848 respectively, which was considerable; and partly from expansion of certain items, such as forest revenue, which do not form part of the regular land revenue, but have been included in Col 4 of the Statistical Table.

15. The second point refers to the increase under Col. 6, Taxes, from 1'86l. mill. in 1878 to an estimate of 18'55l. mill. in 1879, or 3'69l. mill. The causes of this increase could hardly have been explained in the returns, 165 and 166, presented by Mr. Stanhope to the House of Commons last May. The details are these ('000 omitted):

¹ These rates are a little higher than the actual average rates on fully assessed land, as the realizations given include quit-rents, on lands not fully assessed.

	1877-78.	1878-79.	Increase.	Decrease.
	£	£	£	Rs
(a) Excise - - - -	2·457	2·592	·135	—
(b) Assessed - - - -	·086	·869	·783	—
(c) Provincial rates - - - -	·238	2·680	2·442	—
(d) Customs - - - -	2·622	2·440	—	·182
(e) Salt - - - -	6·460	6·900	·440	—
(f) Stamps - - - -	2·993	3·071	·078	—
	14·856,000	18·552,000	3 696,000	

The main increases are under the heads of (b) Assessed. This is due to the imposition of the license taxes on traders. (c) Provincial rates. Of this increase, '400l. mill. is due to new taxation, viz., the Public Works cess in Bengal, and the famine cesses in the Punjab and Central Provinces; and 2·042l. mill., to mere transfer in accounts, viz., the inclusion in the accounts of rates previously separately accounted for as local funds. (e) Salt. The increase of '440l. mill. is due to the reform of the Salt Duties, by which the tax was equalized, being raised in Madras and Bombay, and lowered in the rest of India, and to consequent increased consumption.

Thus the whole of the total increase, 3 876l. mill. (not deducting '182l. mill. decrease on customs), about

1·183l. mill. are due to new taxes, imposed to meet expenditure caused by recurrence of famine; 2·042l. mill. to mere alterations of account, and the rest, '651l. mill. to growth of revenue from existing taxes.

W. G. P.

See also A. Colvin's Memorandum on Revision of Settlement, Appendix I. In certain districts the cultivated area was 10 million acres, at the settlement, and 13½ million at the revision. As the total cultivated area of the North-Western Province is now 25 million acres, it may assumed that, 10 : 13 : : 19 : 25; i.e., that the entire cultivated area in 1840, was 19 million acres, and has increased by six million, or 30 per cent.

MADRAS

No. IV.—STATEMENT SHOWING THE GROWTH OR INCREASE OF SEA-BORNE TRADE IN RELATION TO THE REVENUE DEDUCT PER MAUND OF 80 LBS. IN RELATION TO THE RECEIPTS DERIVED THEREFROM

OFFICIAL YEARS.	CUSTOMS and LAND TRANSIT DUTIES.	VALUE of SEA-BORNE TRADE.			SALT.			REMARKS.
		Foreign Trade.	Coasting Trade.	Total.	Receipts.	Sale Rate per Indian Maund of 82½ lbs.	Quantity sold and Exported.	
1.	2.	3.	4.	5.	6.	7.	8.	9.
	£	£	£	£	£		lbs.	
1800-01 -	194,835	No information.			19,352	9 As. 4 pie, equal to 0·70 farthing pr. lb.	No information	a. In the original Returns the trade is given in Sicca Rupees, and transposed into English money at the rate of 2s. 3d., as shown in Cols 3, 4, 5, from 1802-3 to 1810-11.
1801-02 -	312,493				20,932			
1802-03 -	349,227	1,942,678	2,476,131	a 4,418,809	31,797			
1803-04 -	395,367	2,591,520	2,152,849	a 4,744,369	27,768			
1804-05 -	544,322	1,639,250	2,498,162	a 4,137,712	39,771			
1805-06 -	352,481	1,959,795	2,449,262	a 4,409,057	185,897			
1806-07 -	256,061	1,354,070	2,276,161	a 3,630,531	215,848			
1807-08 -	245,837	1,615,845	3,415,365	a 5,031,210	258,990			
1808-09 -	298,946	1,435,802	2,028,041	a 3,463,843	262,803			
1809-10 -	383,753	1,249,641	2,015,348	a 3,264,989	278,640			
Average of 1st Decade }	333,311	1,723,575	2,413,990	4,137,565	134,180		359,620,800	
1810-11 -	423,170	2,046,482	1,698,594	a 3,740,076	339,610	14 Annas a Maund, equal to 1 farthing per lb.	354,105,600	b. From 1811-12 to 1818-19 the Returns are given in Arcot Rupees which are calculated at 2s. 4d. 3½ Arcot Rupees being held equal to a Panna which is equivalent to 2s. 14d.
1811-12 -	436,532	2,194,879	1,174,253	b 3,369,132	342,593		376,636,800	
1812-13 -	458,720	1,510,269	1,707,976	b 3,218,245	370,643		368,035,200	
1813-14 -	472,276	1,302,337	1,380,156	b 2,082,493	333,321		367,843,200	
1814-15 -	541,286	1,484,903	1,228,809	b 2,713,712	313,388		290,313,600	
1815-16 -	514,300	1,688,188	1,020,909	b 2,709,097	312,666		263,472,000	
1816-17 -	519,067	1,481,844	1,071,807	b 2,553,651	295,716		249,177,600	
1817-18 -	506,660	1,742,968	1,072,245	b 2,815,213	295,917		292,809,600	
1818-19 -	507,716	1,633,394	1,142,703	b 2,732,097	356,680		322,742,400	
1819-20 -	538,659	1,259,455	1,130,388	c 2,389,843	363,627		330,969,760	
Average of 2nd Decade }	491,839	1,635,072	1,262,284	2,897,356	332,416		321,520,576	c. From 1819-20 to 1834-35 inclusive the Returns are rendered in Madras Rupees, which varies but slightly from an Arcot Rupee. The transposition has been calculated at 2s. 14d.
1820-21 -	570,567	1,323,000	1,059,105	c 2,382,105	313,755	9 As. 4 pie a Maund, equal to 0·70 farthing per lb.	385,391,840	
1821-22 -	630,769	2,005,395	1,147,029	c 3,152,424	364,087		470,158,080	
1822-23 -	624,888	1,828,875	962,744	c 2,791,619	336,005		445,829,920	
1823-24 -	573,793	1,807,883	1,278,299	c 3,086,182	356,330		457,515,680	
1824-25 -	536,810	1,947,485	2,269,781	c 4,217,266	327,719		472,086,800	
1825-26 -	557,609	2,308,133	2,287,084	c 4,593,217	359,397		472,417,680	
1826-27 -	545,818	1,707,020	1,886,878	c 3,543,898	330,839		428,036,560	
1827-28 -	566,729	2,387,396	1,283,919	c 3,671,315	346,192		500,015,440	
1828-29 -	610,006	2,049,664	1,527,960	c 3,577,624	404,416		382,471,760	
1829-30 -	590,726	2,375,855	1,582,751	c 3,958,606	469,530		408,670,240	
Average of 3rd Decade }	580,772	1,974,071	1,523,555	3,497,626	360,827		442,259,400	
1830-31 -	581,516	1,515,246	1,295,185	c 2,810,431	443,864	14 Annas a Maund, equal to 1 farthing per lb.	381,640,080	d. From 1835-36 to 1839-40 the Returns are taken out in Company's Rupees which have always been taken at 2s.
1831-32 -	455,689	1,885,049	1,540,122	c 3,425,171	355,816		376,665,520	
1832-33 -	419,072	1,850,556	1,481,762	c 3,341,118	333,360		393,851,440	
1833-34 -	382,885	1,494,329	2,221,193	c 3,715,522	372,416		530,717,920	
1834-35 -	420,130	1,717,593	1,685,636	c 3,403,228	376,408		465,377,860	
1835-36 -	419,076	1,738,057	2,080,747	d 3,818,804	353,848		366,830,720	
1836-37 -	469,445	2,024,402	2,273,659	4,298,061	372,892		368,132,880	
1837-38 -	405,679	1,805,107	1,909,632	3,714,739	379,207		360,582,720	
1838-39 -	407,206	1,890,256	2,103,894	3,994,150	402,953		381,485,520	
1839-40 -	410,287	2,151,628	2,260,591	4,412,219	398,858		383,888,800	
Average of 4th Decade }	437,099	1,808,122	1,885,222	3,693,344	378,962		400,917,296	

Note.—From 1802-3 to 1823-24 the Company's Trade is excluded, but from 1823-24 this trade is included.

PRESIDENCY.

FROM CUSTOMS DUTIES THEREFROM; AND OF THE QUANTITY OF SALT SOLD AND EXPORTED, WITH THE RATES OF SALE IN THE MADRAS PRESIDENCY FROM 1800-01 TO 1877-78.

OFFICIAL YEARS.	CUSTOMS and LAND TRANSIT DUTIES.	VALUE of SEA-BORNE TRADE.			SALT.			REMARKS.
		Foreign Trade.	Coasting Trade.	Total	Receipts.	Sale Rate per Indian Maund of 82½ lbs.	Quantity sold and Exported	
1.	2.	3.	4.	5.	6.	7.	8.	9.
	£	£	£	£	£		lbs.	
1840-41 -	437,635	1,970,546	2,613,193	4,583,739	378,052	14 Annas a Maund, equal to 4 farthing per lb. 1 R. 8 An. = 1·8 farthing.	367,405,600	e. Land transit duties abolished by Act VI. of 1844. New Customs Tariff introduced.
1841-42 -	415,791	2,168,952	2,296,948	4,465,900	399,239		427,963,920	
1842-43 -	427,672	1,987,902	2,245,609	4,233,511	399,761		434,872,960	
1843-44 -	423,545	1,997,760	2,255,692	4,253,452	432,160		417,334,000	
1844-45 -	e 200,166	2,941,971	2,598,651	5,540,622	452,560	1 Rupee a Maund, equal to 1·2 farthing a lb. 1 R. 2 A. = 1·35 farthing.	386,785,280	
1845-46 -	165,105	2,499,193	2,232,101	4,731,294	470,641		402,312,080	
1846-47 -	151,040	2,613,320	2,166,364	4,779,684	455,635		403,880,960	
1847-48 -	135,984	2,600,376	2,000,670	4,601,046	485,721		406,739,040	
1848-49 -	92,876	3,011,582	1,553,006	4,564,588	450,797		408,782,800	
1849-50 -	102,710	2,372,964	2,456,189	4,829,153	464,592		422,412,720	
Average of 5th Decade }	254,252	2,416,457	2,241,842	4,658,299	438,915		407,830,936	
1850-51 -	110,725	2,829,050	2,204,790	5,033,840	477,630	1 Rupee a Maund, equal to 1·2 farthing a lb. 1 R. 2 A. = 1·35 farthing.	417,587,760	f. For eleven months only, the date of the Financial Year having been changed from 30th April to 31st March.
1851-52 -	115,680	3,078,411	2,323,446	5,401,857	483,427		437,604,240	
1852-53 -	120,797	3,575,382	2,599,454	6,174,836	504,265		422,942,320	
1853-54 -	126,528	3,612,545	3,274,045	6,886,590	480,214		425,395,160	
1854-55 -	117,290	3,350,218	2,497,725	5,847,943	487,459		476,327,760	
1855-56 -	130,714	4,242,275	2,868,184	7,110,459	507,734		525,268,240	
1856-57 -	137,728	4,948,647	3,191,614	8,140,261	503,994		483,255,960	
1857-58 -	141,174	5,189,017	4,430,463	9,628,480	572,597		491,878,640	
1858-59 -	154,102	4,863,065	3,621,868	8,484,933	601,954		537,667,440	
1859-60 -	255,577	5,493,002	3,700,354	9,193,356	647,115		544,833,920	
Average of 6th Decade }	141,022	4,118,161	3,072,094	7,190,255	526,639		476,276,344	
1860-61 -	295,388	6,073,863	4,403,720	10,477,583	706,789	1 Re. 8 An. a Maund, equal to 1·8 farthing per lb. 1 Re. 11 An. a Maund, equal to 1·6 farthing per lb. 2 Rupees a Maund, equal to 2·4 farthing per lb.	550,369,040	
1861-62 -	232,522	6,888,153	4,730,935	11,619,088	868,323		524,129,920	
1862-63 -	196,498	8,498,367	4,667,940	13,166,307	912,770		529,514,400	
1863-64 -	229,852	11,422,687	7,396,764	18,819,451	899,272		548,674,400	
1864-65 -	203,878	11,182,878	6,311,478	17,494,356	1,036,670		580,218,320	
1865-66 -	208,553	12,693,280	6,178,420	18,871,700	1,012,760		646,433,360	
1866-67 f	193,539	6,560,071	6,200,723	12,760,794	1,047,573		596,679,360	
1867-68 -	251,902	7,999,859	5,613,473	13,613,332	1,098,802		538,564,960	
1868-69 -	276,591	10,218,675	6,464,235	16,682,910	1,107,253		574,997,840	
1869-70 -	276,485	10,158,853	6,066,400	16,225,253	1,164,736		564,575,120	
Average of 7th Decade }	236,521	9,169,669	5,803,409	14,973,078	985,495		564,915,672	
1870-71 -	304,897	9,133,560	5,316,724	14,450,284	1,264,230	2 Rs. 4 An. a Maund, equal to 2·7 farthings per lb.	544,469,040	
1871-72 -	313,228	10,370,370	5,458,611	16,328,981	1,307,841		561,550,640	
1872-73 -	393,742	9,990,499	9,478,865	19,469,364	1,285,019		548,338,080	
1873-74 -	336,152	10,896,264	10,835,529	21,731,793	1,295,186		535,162,480	
1874-75 -	321,025	10,607,811	10,222,036	20,829,847	1,331,569		573,744,240	
1875-76 -	307,962	11,919,922	8,336,006	20,755,928	1,353,789		584,496,480	
1876-77 -	246,736	10,887,307	16,224,377	27,111,684	1,291,953		522,678,560	
1877-78 -	203,350	9,487,036	19,283,170	28,770,206	1,142,186		494,706,000	
Average of 8 Years }	303,386	10,474,096	10,706,914	21,181,010	1,283,971		545,643,190	

Government stores are also included to 1865-66, after which the private trade is alone shown.

IX.—ECONOMIC CONDITION OF THE PEOPLE.

NOTE ON THE ECONOMIC CONDITION OF THE AGRICULTURAL POPULATION OF INDIA,
BY MR. J. B. PEILE.

1. This note deals with not less than 150 millions out of the 190 million inhabitants of British India. In this vast population, spread over an area of 900,000 square miles the conditions of life are remarkably uniform, the characteristics of the people and the influences which affect them are curiously similar.

2 The agriculturists of India may be divided according to rights of property into landowners, tenants with occupancy rights, tenants-at-will, and labourers. Many of the lower classes live partly by labour and partly by tilling small holdings. The large class of village officials hold land, so also do many of the village tradesmen. Some of the agriculturists combine with tillage the business of money-lending. But with more particular reference to their economic condition the classes who live on the land may be divided into—

- (1.) Those who take no personal share in cultivation and whose women do not labour. These cultivate by means of servants and hired labourers.
- (2.) Those who themselves work in the fields, assisted by their women, but who are assisted by hired labour.
- (3.) Those who cultivate entirely by their own work and that of their families. The people of this class help each other in the busy seasons.
- (4.) Farm labourers.

3. The landholders are of every degree of importance, from the great zemindar with a rent-roll of 400,000*l.* to the petty farmer of under five acres. But the large landowners are comparatively few, while the vast number of very small farmers may be understood from the following figures. In Bengal, out of 9½ million tenants, 8 millions pay rents of less than 5 rupees each. In Madras more than half the Government ryots pay as land revenue less than 10 rupees each. In Bombay the holdings of more than half the Government ryots measure 10 acres or less. It is of the first importance to know whether these great classes of petty farmers have the means of living in tolerable comfort, what their habits are, what property they possess, how they spend their income, and what influences are at work to depress or elevate them. Evidence on these points has been collected from all parts of India, and is printed in detail in Volume 3 of the appendix to the Famine Report.

4. The evidence shows that in a fair average season, with ordinary industry and prudence, the agriculturist obtains some surplus of income after meeting all the expenses incidental to his standard of living. This is the average result, but there are constant disturbing circumstances inseparable from small farming without capital in a country still imperfectly supplied with protection from natural agencies destructive to the harvests. Where the return which his land makes to the farmer is subject to extreme fluctuations, he must, in order to maintain his affairs in equilibrium, adjust his expenditure to the average result, and save in every year of surplus. But this requires more forethought and self-restraint than has yet been generally developed in India. Consequently the commonest and most active of all causes of agricultural debt in all parts of India is the failure of the crops from drought, and the greatest hindrance to the formation of habits of thrift is the caprice of the seasons and the unsteadiness of agricultural profits. The prosperous parts of India are those where the supply of water from the rain-fall or artificial means is constant, and this is true alike of Eastern Bengal where the soil is good and the Bombay Concan, where it is poor, whereas in districts where a plentiful harvest is obtained with comparatively little labour in good seasons, but failures from drought are frequent, the agriculturists are of inferior industrial quality, and extravagance, improvidence, and sloth are common.

5 The condition of the landed classes has also been much affected by the action of new influences during

the last half century on the character and habits formed by the people during its previous history. Agriculturists generally, before British rule, existed in a state of serf-like tutelage and dependence on higher authorities. The cultivator had no rights to trade with, and little concern beyond raising and harvesting his crops. All beyond this was managed for him by the State farmer or revenue officer, or the village headman, and the village banker who made him advances also conducted his business in subservience to the local authorities. Being too ignorant to keep accounts, he was content to leave all such matters with the village banker, who supplied him with food and other necessities in the months before the harvest, and took over the greater part of the crops in repayment of these advances with interest. This aspect of rural life still prevails unchanged in the native States of India, and the habit of carrying on a running account with the money-lender is still common in the British districts also. But new influences have ruffled the dull level of village experience. The value of landed property has increased with the rise of prices. The rights of landlords and tenants have been inquired into and defined, and the former have learned to use their power of raising rents. Money-lenders have lent more freely on the security of ascertained interests in land. Surveys have accurately measured and defined estates. Railways and roads have opened out new markets for produce. Cultivation has expanded and the margin of waste land has decreased. The cultivator feels himself circumscribed in his miscellaneous perquisites of pasture and forest produce, he pays for all the land he occupies, and his liberty of fallowing is curtailed. Trade is infinitely brisker, there is a vast demand for exportable products. To deal with these new interests, a more exact and more summary administration of civil justice and civil process has been introduced. The Government has interposed to settle by law the relations of landlords and tenants in Northern India, and over a vast area in Southern India has swept away the old system and enlarged the interests of millions of petty farmers into those of quasi-proprietors of their holdings. The rapid course of national development thus briefly sketched has brought with it the materials of prosperity to men of thrift and enterprise; but on the other hand there is danger to a population at a low level of industrial and moral qualities when it is overtaken by an influx of social progress which outstrips its advance in education and intelligence. The result is traceable throughout the evidence collected as to the present condition of the landed classes, and forms the darker side of the picture. It may be said that the general condition would be satisfactory if the smaller agriculturists could rise to the exigencies of this change from a primitive to a fairly advanced stage of society, but this they have not yet done, and certain social diseases have fastened upon them in consequence, which makes it necessary to temper the stress of circumstances to their weakness.

6 It may be in place here to mention certain parts of India in which it is stated that the agriculturists have maintained or achieved fair average prosperity. In the Punjab the villages under irrigation from the canals are said to be in good circumstances both from the increased productivity of the land and the protection from caprice of the seasons. The villages similarly protected in the North-Western Provinces are equally prosperous. The tenants of Eastern Bengal have acquired such substance, partly from the profits of jute cultivation, that they are stronger than their landlords, and this part of the country is said to require a law for the prompt recovery of rents clearly due, but wilfully withheld in pursuance of an organised opposition to the landlord. The agriculturists of a large part of the Central Provinces have been enriched by the rise in the value of agricultural produce from the date of the American War. The Berar peasantry have thriven under the

same influences. The agriculturists of the Madras deltas under irrigation from the Cavari, Kistna, and Godavari enjoy a steady prosperity from the regular harvest of rice. The people of Burmah are blessed with a steady rainfall and profit by a large export trade. All these owe their prosperity to immunity from drought under the natural rainfall or artificial irrigation. Other districts are prosperous in a less degree, such as the Southern Mahratta country, where the soil is good and the profits of a cotton crop considerable, but there is some danger from drought; Guzerat, of which the circumstances are similar, and the Concan, where the rainfall is steady but the soil poor, and the necessity for steady industry has taught the people thrift. It must not be concluded that in any of these tracts the agriculturists are free from all embarrassments. There is everywhere a serious amount of agricultural debt, and, at any rate, there is everywhere the habit of running accounts with the money-lender, which always slides into debt when a crop is lost or a bullock has to be replaced.

7. As the prosperity of the people is greatest where the returns to cultivation are most regular, so is it lowest where the returns are most precarious. Other causes have, however, combined to produce the most notable cases of agricultural depression. Thus in Behar the tenant class is remarkably resourceless and poverty-stricken under the exactions of an oppressive body of middlemen, against whom they are too ignorant and weak to assert the rights assigned them by law. In Jhansi, first loss from drought, and then some administrative mistakes appear to have preceded the appearance of an extortionate class of money-lenders, who availed themselves of the right to transfer land given to the cultivator by our Government, and the trenchant procedure of our civil courts. In the Bombay Deccan the case was somewhat similar, the enlarged rights of property in agricultural holdings, the consequent expansion of credit, and the fluctuations in the value of land and produce under the influence of foreign trade having drawn the poorer occupants into difficulties, which attracted an inferior class of alien money-lenders. But the first condition of agricultural well-being appears to be regularity of the rainfall and the harvests, by aid of which the tenant in Eastern Bengal has grown stronger than his landlord, although he is under the same law as the tenant of Behar, and the poor but thrifty cultivator of Ratnagiri has been spared the irritation of debt, which has led to agrarian disturbances in the Deccan.

8. The ordinary Indian agriculturist appropriates the produce he raises, or its money value under the following heads:—

Rent due to his landlord or revenue due to the Government.

Food.

Seed

Hired labour.

Replacement of implements and livestock.

Clothes.

These items are necessary and recurrent. Others which are occasional and more discretionary are family ceremonies, purchase of ornaments, and payment of debt.

His produce gives him, without purchase, grain and vegetable food and seed, straw and grass for his cattle. The cattle give him milk, manure, and fuel. He has for sale the part of his produce he does not consume (which may be grain or cotton, oil seeds, or sugar-cane) and perhaps some grass, straw, butter or ghi. The women of the family may earn wages in kind for picking cotton, which they spin into yarn and sell. The men earn hire as carriers. The agriculturist pays in cash his rent or revenue, and has to buy cloth, oil, and condiments, tobacco implements, and from time to time plough cattle. He does not employ much hired labour, the poorer cultivators working for each other in turn.

9. The food of the agriculturist consists of cakes made of millet, or rice in the rice countries, with cakes or soup made of the flour of pulses, a relish of condiments, and vegetables. Meat and fish are eaten perhaps more universally than is supposed, but as an occasional, not a constant article of diet. The condiments used are salt, tamarind, cocoa-nut, peppers, turmeric, coriander, assafoetida, and many spices. Salt fish is also eaten as a relish. The vegetables are onions, garlic, various garden or wild salads, and sometimes carrots and potatoes. The more prosperous families also use milk. On festivals, ghi, molasses, and sweetmeats are consumed. Fuel is not bought, cow-dung cakes being commonly used, or sticks which are collected by the children. Agriculturists have generally two meals, at noon and evening, but sometimes also a little parched grain is eaten in the early morning. A labouring man consumes 2 lbs of grain daily when he can afford his full allowance. Women and children eat less. Six maunds (of 82 lbs) per head per annum is about the average consumption. To the grain is added a little ghi or oil, salt, vegetables, and a small quantity of the above condiments to make up the daily diet. When millets cost 1 rupee per 34 lbs, the money value of the daily food of an agriculturist in full work will be about 2 annas (3d.) per day, of which five-eighths will be for grain, one-eighth for vegetables, and one-fourth for spices or condiments, tobacco, oil, and salt. The poorest class reduce the cost for grain by eating the cheap small millets and wild vegetables, and by spending less on condiments.

10. The cost of clothing varies with the climate and the condition of the agriculturist. It is higher in Northern India than in the Southern Provinces where the climate is warmer, and shows the prosperity of a cultivator must not be judged by the scanty garments which he finds sufficient. It may perhaps be placed at 2 to 5 rupees yearly for the working man or woman, and less for children.

11. The ordinary agriculturist's property consists of clothes and bedding, brass or copper cooking utensils, bedsteads, agricultural implements, plough or milch cattle and a house of mud with thatched or tiled roof. Ornaments, if they exist, represent invested savings, and these are sold for food in time of drought. In 1876-8 ornaments to the value of two millions sterling found their way to the Bombay Mint.

12. The results of farming are far too various to be reduced to any average values, but the following instances are selected from the evidence to give some idea of the scale of an ordinary agriculturist's transactions during the year.

NORTH-WESTERN PROVINCES.

	Area of Farm.	No. of Family.	Gross Receipts.	EXPENSES.				BALANCE.
				Cost of Hired Labour and other Outlay.	Rent or Revenue	Domestic Expenses.	Total Expenses.	Credit.
	Acres.		Rs. A.	Rs. A.	Rs. A.	Rs. A.	Rs. A.	Rs. A.
Landowner - - - - -	52	3	318 0	28 0	27 0	162 0	277 0	41 0
Occupancy Tenant - - - - -	22	5	298 0	40 0	71 0	127 0	238 0	60 0

CENTRAL PROVINCES.

Occupancy tenant - - - - -	44	7	345 0	20 0	51 0	215 0	286 0	59 0
Do. - - - - -	25½	6	178 0	9 12	26 0	129 6	165 2	12 14

HYDERABAD.

Occupancy tenant - - - - -	50	5	552 8	96 0	50 0	180 8	326 8	226 0
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¹ See Mint Master's letter.

The return per acre is generally understated by agriculturists of whom inquiry is made. A native official of the Nizam's Government takes the average out-turn of millet at 480 lbs per acre, worth Rs. 9. 10, besides the value of the straw. An average return of Rs 9 per acre was admitted by the Bombay ryots questioned by a native member of the Commission.

The management of an ordinary Deccan holding of 40 acres of fair land, supporting four adults and two children, might give something like the following results in an ordinary year:—

	Lbs.
Gross grain produce at 5 maunds of	
82 lbs. per acre on 40 acres	16,400
Deduct—	Lbs.
Seed at 6 lbs per acre	240
Food, 10 lbs. per diem	3,650
	3,890
Balance of produce available for sale	12,510
	Rs. a. p.
This is worth at wholesale price, 40 lbs. per rupee—	312 12 0
Deduct—	
Expenditure in cash—	Rs. a. p.
Government land revenue	40 0 0
Local cess	2 8 0
Labour	40 0 0
Replacement of implements and stock	40 0 0
Purchase of condiments, at Rs. 5 per head	30 0 0
	152 8 0
	160 4 0

The margin for clothes, ornaments, ceremonies, repayment of debt, is thus Rs. 160. 4. The ryot has besides the straw of his grain crop and the grass on the margin of his fields to feed his cattle with or sell. The cattle give him milk, fuel (cow dung), manure, butter, and ghi. The work of his farm occupies the agriculturist about 231 days in the year, leaving 134 days in which he, with his cart and bullocks, can earn money by the carriage of goods, and his wife and children the wages of labour.

13 The Government land revenue has been estimated when it is highest at 8 per cent. on the value of the gross produce. Landlords' rents of course bear a much higher ratio to the total out-turn, but in a very large proportion of the cases given in the evidence the agriculturists have admitted a fair surplus of profit after all expenses of cultivation and living have been met.

14 With regard to the cost of hired labour it must be remembered that this expense is generally to be debited against the larger profits of raising the more valuable products. Little hired labour is used in raising the coarser produce. Thus it is stated by Native witnesses of position and experience, "With a family of four a cultivator is seldom obliged to employ hired labour for weeding, thrashing, harvesting, &c. One family will help a neighbouring family in reaping their harvest, and they in return will assist them." Again, "He is seldom required to employ hired labour, unless he happens to have a very large holding, his wife and children assisting him in the labours of the field."

15 The domestic expenditure appears to be often unduly swollen by the excessive number of persons subsisting on small holdings, and this is no doubt a cause of indebtedness. The following are instances from the evidence:—In the Punjab 19 families, with an average of eight persons per family, cultivate holdings averaging 11 acres. In North-Western Provinces 230 acres are cultivated by agriculturists who, with their families, number 820 persons. In another case a family of 22 persons is supported on a farm of 16 acres. Excessive sub-division, leading to the multiplication of minute holdings, is another cause of poverty. While the average number of an Indian family is somewhat over five and the number of persons in an agricultural household is very frequently more, the average area of tenant holdings is in the Punjab about six acres, in the North-Western Provinces under five acres, in Oudh three acres, and in Bengal probably about the same. In these provinces there are 14 millions of tenant holdings.

16 The moral qualities of different races or classes of cultivators appear to have more influence on their prosperity than the pressure of rent or the quality of

the soil. Thus in the Punjab the ahirs and jats are described as eminently industrious, thrifty, and prudent. "Though much of the land occupied by them (ahirs) is of an inferior description, and the incidence of the revenue very high, they have, by unremitting toil, compelled the soil to yield them a wonderful amount of produce, and have by prudent thrift kept themselves and their lands free from debt. Next to them come the jats." And in the North-Western Provinces, "A jat and a gujar holding the same kind of land, and paying the same rent rate, are found to differ very much in prosperity, simply because the former is much more enterprising and frugal than the latter, and the women of his house assist him in field work, while those of the other merely do housework." On the other hand, it is stated of the meos in the Punjab that, "without the excuse of a barren soil or an excessive revenue, they live so closely up to their income, are so negligent in developing the resources of their land, and indulge so in unwarranted expenditure, that the failure of one harvest plunges them irretrievably into debt." The distinctions here traced to race are elsewhere observed to result from physical conditions. Thus the Mahadeo W. Barve says, "The poverty of the soil below the ghats has stimulated the industry of the cultivator, while the fertile plains in Dharwar and other districts have fostered indolence in their occupants. The former is parsimonious, careful, and enterprising; but the Deccan ryot is extravagant, improvident, and sluggish." An officer of the Nizam's Government draws a similar contrast between the "idle, shiftless, and improvident" cultivators of Telungana and those of the Mahratta districts.

17. Social position also has its effect. Generally speaking, the landowning aristocracy has a tendency to sink into debt. The causes are extravagance, family pride, large expenditure on ceremonies, and hospitality. As landowners can offer the best security, they enjoy a fatal facility for improvident borrowing. They will not cultivate with their own hands, and their profits are therefore smaller. Tenants with rights are better farmers, and from inferior social position have not the same temptation to extravagance as landowners, while the security they have to offer for loans is not quite so good. Tenants-at-will have a still more restricted credit, while they have almost no resources, the amount of their debt is smaller than that of the superior classes.

18. There are, however, certain occasions for extraordinary outlay which are stated as the common causes of debt all over India. These are: (1) family ceremonies, such as marriages, betrothals, funerals, pilgrimages, and festivals; (2) a failure of the crops from drought, when grain must be borrowed for food and seed; (3) loss of plough bullocks. Of course, if it were the custom to lay by the surplus profits of good years to meet special emergencies, these calls might be met without borrowing. But the evidence that saving is not the practice of the agriculturist is very general. Thus, in the Punjab, "the entire produce of a harvest is usually made over by the owner to his banker, and what the owners need for their food and expenses, and seed and Government revenue, they take in kind and cash from the banker." Again, "the agriculturists do not usually store grain in their houses; they give it all at harvest time to the village traders." Again, "the agriculturists are careless in disposing of their produce. It is an almost universal institution that shopkeepers should take the whole of the Government share of the crop, and pay the cash revenue for the agriculturist." "The crops have generally been forestalled. When they are harvested the creditors carry off the whole, and the agriculturist has to begin again borrowing for his daily wants." Again, "it is contrary to their habits to keep ready money by them. If a man makes a few hundred rupees more than his expenses, he will not keep any part of it for a bad year. He at once buys more land or more bullocks, or ornaments, or a wife. If, then, there is a bad harvest next year he must go to the money-lender. No agriculturist ever has a balance to the good with his banker." Again, "every peasant has a running account with his bahia, and borrows money as a matter of course to defray marriage or burial

¹ P. 239.

² P. 253.

³ Alimulla.

⁴ Mirza Azim Beg.

⁵ Mr. O'Brien.

⁶ Mr. Thorburn.

"expenses, and at times to pay his revenue. He borrows food grain from the bania, and returns up to double after harvest. Most peasants live up to their means, and, except in the shape of bangles, never have any capital in hand." In the North-Western Provinces¹ "The greater part of the proceeds realized from the sale of agricultural produce, after paying rent, goes to the money-lender." Again,² "Very few tenants keep grain in their house for the daily expenditure. The bania supplies them with grain and other necessary articles for four months before each harvest, and also pays the rent for them, and when the produce of the field is ready he takes nearly the whole away in satisfaction of these advances and interest. For the grain supplied he charges half an anna per rupee above the market price, and when he takes the produce home he credits its value to the owner's account at the rate of half an anna per rupee less than the market value. Besides these discounts and premiums he takes interest at 25 per cent. per annum." Again,³ "A great portion of the small cultivators borrow their seed. The rate of interest is 25 per cent., or when the security is bad 50 per cent." The class whose expenditure is here detailed go into debt for every fresh marriage or funeral, and work out the amount." In Bengal,⁴ "the ryots are as a body uneducated and thrifless, and have not yet learned to hoard." Again,⁵ "Were it not for his improvident habits, the surplus would go far towards guaranteeing him from the incursions of famine. The rates at which money and food grain are advanced are simply exorbitant." In the Central Provinces,⁶ "the worst feature of their operations, which brought almost hopeless ruin to the cultivators, was the system of selling the coming crops at certain rates fixed at random, not for cash, but on account of old debts." In Berar,⁷ "the produce of the land is made over to the money-lender, who supports the ryots by advances at high rates of interest. They know nothing of accounts, and are entirely at the mercy of the money-lender." Again,⁸ "The instances of accumulation of surplus income are very few. The agriculturist spends on marriage and other ceremonies not only the surplus income, but all that he could obtain on credit." In Bombay,⁹ "under ordinary circumstances, the ryot is generally able to manage his expenses within his income; but he is somewhat improvident, and saves little, though he is often in a condition to do so. When he is required to undertake any extraordinary expenses, such as those for buying cattle suddenly lost, &c., his savings seldom come up to his requirements. He has then recourse to the village money-lender." In Madras, "the poorer classes of ryots are generally in the hands of the village money-lender, who advances the expenses necessary for cultivation, recovering them in kind at a much lower value than the market rate of the day." In central India, "he rarely, if ever, has any grain in stock. On the contrary, he generally disposes of his expected land produce long before it is reaped to his creditor. The mahajan supplies him with grain for food, for seed, for wages, which are paid in grain to field labourers, and generally for all the tenant's wants." Of the kunbi cultivator under the Nizam it is stated,¹⁰ "In prosperous seasons he does not lay by money for years of scarcity. What he gets he generally spends, and leaves the future to take care of itself."

19. On the other hand, there is evidence that all these unfavourable influences may be overcome if the agriculturist avails himself of external causes of prosperity. Thus it is stated,¹¹ "There can be no doubt that in the last few years the ryots of Lower Bengal have, owing to the springing up of the jute manufacture and the high prices of all agricultural produce, taken a great step towards putting themselves on a better and more independent footing." In the Central Provinces,¹² "it is believed that during the past six

years a considerable proportion of proprietors and cultivators have, practically speaking, freed themselves from the burthen of indebtedness, and that few who ten years ago were solvent have retrograded. With the increased prosperity of the cultivators, and the facilities they now have of taking their own produce into brisk markets where there are European or Bombay Native agencies, the formerly almost universal custom of selling their crops before the harvest in advance, is fast disappearing." In the Kistna district of Madras,¹ "the ryots of the delta-irrigated villages of this district are, as a rule, in most comfortable circumstances; not a few are rich, and combine commercial with agricultural pursuits." In the more advanced districts the agriculturist invests his capital in land or ornaments, and himself becomes the banker of the poorer cultivators.

20. It would appear, therefore, that Government can best improve the economic condition of the landed classes by extending the means of irrigation which secure regular harvests, and the roads and railways which carry produce cheaply to market, and that otherwise wealth will increase in proportion to the success attained in supplying the demand of foreign nations with Indian products. In the more backward districts it is clear that the low level of prosperity is in a measure due to old improvident habits and to ignorance. The Government revenue forms so very moderate a percentage of the gross produce that it cannot be accused of encroaching unduly on agricultural profits, and if it were remitted altogether the solvency of the ryot would not be materially affected. It is true that he commonly pays it by an order on the village banker, but he manages all money payments in the same way, being ignorant of accounts, and leaving all his affairs in the money-lender's hands. It has been argued that he would prosper better on the system of "batai," under which the harvested crop is taken to the village grain yard and divided into shares between the cultivator and the owner of the rent. Batai, it is said, adjusts itself to the caprice of the seasons, if there is little to divide, the cultivator pays little; if there is nothing to divide, nothing is claimed of him. Batai is still the system in force in many Native States, and between vast numbers of landlords and tenants-at-will in all parts of India; and if it is desired to keep the agriculturist permanently in the character of an irresponsible agent something may be said for it. But batai taxes severely the profits of improved agriculture. Batai rents are so heavy that inferior lands cannot be cultivated under them, and the system has never in practice been free from great fraud and oppression. Nor, it is plain, would this system suffice to rescue the people as they now are from debt. This can only result on the formation of a higher industrial character, for which we must look to the slow advance of popular education, where it is not attained more summarily by some great and lasting accession of material prosperity. If in the meantime large classes are not yet fit for independence, and it is found expedient to revert to a closer oversight and interposition in their affairs, the best means appear to be cheap and accessible civil courts, and executive action to regulate the use of agricultural credit, and to control agricultural loans and the recovery of agricultural debts.

21. Below the lowest class of landholders comes the field labourer.² This class consists largely of people of the lowest castes. The poorer cultivators drop down into it when in distress, while in prosperous districts day labourers sometimes raise themselves by thrift into the position of cultivators. The labouring class has no resources, and having no security to offer is generally unable to borrow, and is thus seldom in debt. But a famine at once throws them on public or private charity. The labourer is paid variously in money or in grain, or by a mixed wage of both. Some are employed permanently, others by the job or the month for weeding or harvesting. It does not appear that agricultural wages have recently risen, except where, as in the Central Provinces and in the coffee districts, or in any place where large public works are in progress, there is an increased demand for labour. As the labourer is everywhere paid to a large extent in kind, his food does not cost him more when prices of produce are high, and he may even profit by them if he has a surplus of grain wages to sell. Like the classes above him, he spends freely on marriages and funerals, and borrows for these purposes where he can.

¹ Babu T. V. Mukharji.

² Raja Sakhsan Sing.

³ Mr. Spedding.

⁴ Mr. Toynbee.

⁵ Babu Roy Kumar Sirkar.

⁶ Babu Rao.

⁷ Wassadeo Bhalal Kher.

⁸ Sir Krishna Nathar.

⁹ R. B. Mahadeo W. Barvé.

¹⁰ Mr. Furdunji Jamsetji.

¹¹ Mr. Toynbee.

¹² Mr. Nicholls.

¹ Mr. Wilson.

² Field labourers.

In the Punjab and North-Western Provinces the field labourers are chiefly of the chamar (carrier), weaver, and sweeper castes, but the cultivating classes, such as jats and gujars, also sometimes work for hire. The larger landowners employ labourers all the year round. The smaller farmers hire labour for ploughing, weeding, watching the crops, and harvesting. Sometimes labourers are taken into partnership and receive a share of the crop. Sometimes they obtain advances from their employers, which they work out. Various rates of wage are quoted in the evidence. Thus, in Delhi, the wage of occasional labour is 2 annas a day for a man, 1½ for a woman, 1 for a child. In Kurnal the highest permanent wage named is Rs. 4 per mensem, with or without one meal a day. Elsewhere it is Rs. 1. 8 to Rs. 2 per mensem, with food. Harvest labour is generally paid in grain, and at a higher rate, 12 or 14 lbs. of grain a day being named.

The yearly income and expenditure of a ploughman in the North-Western Provinces are stated in the evidence, the former at Rs. 59. 6. 8, and the latter at Rs. 49. 2, leaving a balance of Rs. 10. 4. 8.

In Bengal, harvest labour is as a rule paid for in kind, occasional labour partly in money and partly in kind. The labouring class lives from hand to mouth, but it is stated that "in many parts of the country they too have recently been able to force up the rate of wages."

In the Central Provinces the condition of field labourers is somewhat more hopeful: "As soon as they scrape together enough money to buy a pair of bullocks they set up on their own account; and this constant upward movement keeps up the rate of wages." The grain wages are liberal, and labourers often cultivate small holdings of their own. The following calculation is given of the yearly income and expenditure of a labourer with a wife and two children able to work:—

Grain wages, man	1,516
boy	760
	2,276
Family consumption	1,600
	676

676 worth Rs. 20 0
Money wages - 26 12

Total	46 12
Cash expenditure for clothes and condiments	36 0
Balance	10 12

In Berar it is stated¹ that men employed by the year get from 80 to 100 lbs. of millet grain per mensem, and an annual money payment of from one to four rupees, or if the whole wage is in cash from 32 to 35 rs. with some perquisites.

For harvest labour a man is said to earn 10 lbs. of millet grain per diem. The earnings of labour by the day are estimated at Rs. 32 per annum for a man, and Rs. 16 for a woman, which is stated to meet their expenditure, with no surplus.

In Bombay the wages of labouring men are in some districts 2 annas per diem, in others 3, and the highest named rate is 4 annas. At harvest the men receive 8 to 10 lbs. of gram a day, and the women about half that quantity. The rates in Madras are about the same. In Hyderabad the wage of common field labour, such as weeding, is, for a man, 2 annas a day, and for a woman or boy, 1 anna. Labourers employed throughout the year receive Rs. 1. 8 per mensem with food, and Rs. 2. 8 to Rs. 4 without it, or in Telingana Rs. 3 per mensem, with a present of grain or money at the harvest.

22. The labouring class could hardly subsist on the low money wages above described, but they make a living by payments in kind, or by a percentage of the harvest, and by the various perquisites which they receive, eked out, when field work is scarce, by wild produce, such as roots, grasses, fruits, and seeds. Grain wages being fixed by custom to some degree protect them from the pressure of high prices, but they have no alternative field of employment, by resort to which they might reduce the supply of agricultural labour and thereby raise the rate of wages, nor is the increase of their numbers likely to be checked by prudential motives.

OBSERVATIONS ON THE CONDITIONS OF THE LAND-CULTIVATING RYOTS IN SOME OF THE NATIVE STATES VISITED IN CONNECTION WITH FAMINE COMMISSION ENQUIRIES, BY MAHADEO WASUDEO BARVÉ.

Whilst travelling with the Famine Commission on duty, I had occasion to visit some Native States; and I availed myself of the opportunity thus afforded me in collecting information in regard to the condition of the cultivating ryots. It was thought desirable to obtain this information at first hand from the cultivators themselves, or from others intimately acquainted with the revenue administration of the land. The States which were visited and about which enquiries were made were Ulwar, Jaipur, the territories of their Highnesses Scindia and Holkar, and the outlying districts forming part of His Highness the Nizam's territory near Sholapur. I shall first succinctly state the facts collected in reference to the different States, and then proceed to make general observations thereon.

JAIPUR.

Land-revenue.—The assessment on grain-producing land is calculated in kind, although levied in cash. In holdings where wells exist, it is usual to demand one-fourth of the crop as the royal share. But in those which have no such wells, one-fourth, one-fifth, or one-sixth of the produce is demanded, according to the productive capacity of the soil. These grain assessments are then valued in cash according to the prevailing rates, and then levied by the tahsildars. The rates of assessment on lands growing sugarcane vary from Rs. 3-8 to Rs. 6-12.

There are indeed holdings where the assessment rises as high as Rs. 10-8. But such are few, and are those which are specially favoured by nature, and happen to be sublet by superior landholders. The assessment on cotton soils is Rs. 3-8, and on those producing maka varies from Rs. 1-8 to Rs. 3-8.

It is worth noting that revenue assessment is levied

on lands actually cultivated, and not according to the list of registered holdings. It would appear, further, that remissions, when necessary, are not unusual. During the last year nothing was levied from those lands which yielded nothing, and in respect of those where there was a partial failure of crops there was a proportional abatement of the State demand.

The following is a comparative table showing grain-rates which prevailed during 1876 and 1878.—

NAME OF ARTICLE.	Rates in lbs. during the years 1876 and 1878.	
	1876.	1878.
Wheat	40	20
Gram	54	28
Tur pulse	—	12
Mug	28	16
Bajri	40	30
Jowari	42	34
Cotton	—	—
Rice	28	16
Urid	28	16
Gul (middling)	20	14
Ghee	4	2½
Oil	9	6
Maka	56	34

The above will show the marked rise of prices during the interval of two years. Jowari, bajri, and maka are the staple food-grains of poor classes.

¹ Mr. Toynbee.

OOLIN,

being an important sir subha of Malwa, fairly represents the territories of His Highness Scindia.

Land-revenue.—The assessment is not subject to frequent revisions. About twenty years back there was one revision after a number of years by Sir Dinkarrao Rao Rajé, K. C. S. I., the then Dewan of Gwalior, and since then the rates remain unchanged. The revenue is recovered in four equal instalments, which fall due on Kartika, full-moon day (October or November); Pausa, full-moon day (December or January); Falguna, full-moon day (February or March); Vaishakha, full-moon day (April or May) respectively. These periods appear to have been fixed according to the time when the different crops are reaped. For the assessment on maka crop is levied at the first instalment; that on jowari, tur, mung, bata, chawli, urid, at the second; that on cotton, at the third; and that on opium, wheat, and gram, at the fourth.

The village officers are lambardars and patwaris, corresponding to the patels and kulakarnis of the Deccan respectively. As a rule, they are watpadars; but where there are none such, it is usual for the State to nominate some one for the duty temporarily. The duty of the patwari is to write the village accounts, and that of the lambardars to assist in the collection of assessments—either the banya, where the Government revenue has been farmed, or the State, where the villages are khalsa, or under the direct management of the State. In order to save itself the trouble and the risk, the State generally prefers to farm out the revenue of the village to banyas, who are paid five per cent. on the total revenue of the village, that being charged in addition to the ordinary assessment on the cultivators, who are called kirsans or kashthagars. But it must be observed that this banya has in no case the power to recover in virtue of his farm more than the fixed assessment, added to the percentage due to him. To guard against losses of land being thrown up, the State holds the lambardars in khalsa villages, and the banya in farmed villages responsible for the whole revenue. It thus becomes their interest to see that no arable land remains uncultivated, and that when it is thrown up it is re-set.

Sir Dinkarrao's settlement of land-revenue contemplates remission of assessment under no emergency, whether *asman* or *sultani*. When there happens to be total failure of crops, the prayer of the cultivator for a remission is considered; but on no account is any such remission ever granted in cases of partial failure. No cultivator of land has any proprietary right therein, and is liable to be turned out in any year. The richest crop is that of opium. A bigha, which is equal to seven-eighths of an acre, produces on an average 10 lbs. of opium at Rs. 4 per lb., and poppy seed about 240 lbs., valued at Rs. 18. The same land, however, yields in addition a maka crop, which is valued at Rs. 20; so that a bigha of opium land thus yields about Rs. 78. Against this is to be set the expenditure of Rs. 10 to Rs. 15 for assessment, about Rs. 12 for manure, and Rs. 20 for bullock hire and labour. Dry-crop lands never yield more than Rs. 3 per bigha. Defaulting tenants are liable to distress¹ and sale of their cattle and chattels. As a rule, 75 per cent. of the ryots are involved in debts, and are totally in the hands of the money-lending class. Poppy cultivators are generally well-to-do, and are independent of the banya.

The following is a comparative statement of the rates of food-grains and some other articles of consumption in 1857 and 1878:—

NAME OF ARTICLE	Rates in lbs. during the years 1857 and 1878	
	1857.	1878.
Wheat - - -	80	19
Gram - - -	65	27
Tur - - -	65	20
Urid - - -	120	20
Jowari - - -	140	28
Maka - - -	200	30
Gul - - -	25	10
Ghee - - -	5	2
Opium - - -	Rs. 8 per seer	Rs. 8 per seer
Cotton, cleansed - -	5	4
Rice - - -	28	14

¹ See.

Transit duties are invariably levied on all imports and exports, even within the territory itself.

INDORE

Land-revenue.—The mode of collecting revenue is the same here as in Scindia's territory. The farmer of the village revenue is in this State allowed 10 per cent. upon the aggregate collections as remuneration for his labour. His power of demanding assessment is limited by the fixed customary amount; and he is responsible for payment to the State irrespective of cultivation and payment by the cultivator. The remedy of the farmer against a cultivator failing to pay the assessment lies in a suit in a revenue court. The dwelling-house, implements of husbandry, and seed, are exempt from attachment in execution. Claims for remissions are considered only in cases of total failure of crops. No cultivator has any proprietary right in the land, and is a tenant-at-will.

The rates of land assessment are as follows:—

1. Irrigated lands growing opium, sugarcane, ginger, turmeric, ground-nut, &c., pay from Rs. 6 to Rs. 30 per bigha.

2. Tobacco, maka, and chillies, pay from Rs. 3 to Rs. 5 per bigha.

3. Dry-crop lands growing wheat, jowari, rice, mung, tur, urid, peas, cotton, linseed, til or oil seed, siras, &c., pay from Rs. 1-8 to Rs. 2.

4. Grass lands (kurans) at Rs. 1 per bigha.

5. Grazing lands pay 4 annas per bigha.

No cultivator can sell, mortgage, or in any other manner alienate his holding without the previous sanction of the State specially obtained. This restriction obtains in the case of mamdars as well.

HYDERABAD.

Enquiries were made of some of the outlying districts of His Highness the Nizam near Sholapur forming two zilas only, *id.*, Varhad and Balaghat. I will give it below as it came to me:—

The rates of assessment vary according to the quality of the land. It ranges between Rs. 8 and Rs. 12 per bigha in respect of garden lands where sugarcane, &c., are produced; between Rs. 8 and Rs. 10 in respect of kuran lands; and between Rs. 2 and Rs. 3 in respect of land growing wheat, &c.

The assessment, once fixed, never varies year by year, according to the expected outturn upon an inspection of crops. Nor is it ever increased, whatever kind of crop is grown in the land. The assessment is levied in cash, and has no reference to the produce of a particular year. It is not customary to farm the revenues of villages, as that is collected by patels and kulakarnis, who receive a certain percentage as their emolument for their service.

The number of ryots who have no debts is about 5 per cent. As regards garden land, it is usual for the ryots to rent as much land only as is expected to have a sufficient supply of water; and assessment has to be paid on as much as is rented and cultivated.

Under the old system, one-fourth of the land is set aside for grazing purposes.

In years of drought, there have been instances when one-fourth of the assessment due was remitted, and when the assessment due at once was recovered by instalments extending over some years.

A revised survey and settlement is being introduced throughout the territory on the model of that which obtains in British territory.

From the foregoing, it will appear that in the Native States inspected, which may be taken fairly to represent their class, the rate of assessment is invariably higher than in British territory; that the cultivators there are as deeply involved in debt as here, if not more so; that the living and the status of the cultivator is in no way better in the Native States, and that, in short, it can by no means be said that a cultivator living under a native rule fares better than his compeer in British dominion. The glowing colours in which the fate of the British tiller of land is sometimes bemoaned, and that of the cultivator in the Native States extolled, by many, vanish before the observation of actual facts. The paucity of reliable information available on the subject has afforded those visionaries an opportunity to palm on the public, without a fear of contradiction, certain products of their imagination as undisputed facts. My own observation has led me to believe that our cultivator enjoys certain advantages over one under Native rule; and that an exposure in its nakedness of the condition of the latter will not fail to open the eyes of the former to the superiority of his lot.

As observed above, there is an essential difference between the systems of realising assessment obtaining in the Bombay Presidency and in the Native States. In the ryotwari system that prevails to a very great extent with us, the ryot is directly responsible to Government for the assessment due from him. There is in Native States, on the other hand, always a middle-man in the farmer of the revenue of the village. So far as the pressure of the assessment on the ryot is concerned, the above-mentioned difference in the mode of the realisation of revenue is of no consequence; inasmuch as it is immaterial whether a certain demand is made by the Government direct or through the medium of another individual, so long as that demand remains unaltered. It is indeed said that the Government mode of realising revenue, *viz.*, that of distress¹ and sale, is stringent and not accommodating to the different mishaps to which a cultivator's calculations are frequently liable. But there appears to me no ground to expect greater leniency from a private farmer, who has only a temporary interest in the prosperity of the peasantry, than from Government, whose interests are indissolubly wound up with those of the subjects. The respite in payment that he occasionally allows to disabled ryots is deemed by those ignorant people a great boon; but they hardly know at what price that is purchased in the shape of interest paid for arrears.

The absence of anything like alienable interest in the land operates in the case of the cultivators in a Native State to make their condition much worse than that of their brethren in British India. The social status of a man varies directly as his credit; and all circumstances combine to reduce this credit to a minimum when a peasant can neither sell, mortgage, nor otherwise alienate his holding. The necessary result of such absence of credit is the difficulty of obtaining loans without stringent terms. The British ryot, on the other hand, has a tangible interest in his holding, which can serve as a good security to the creditor, and which therefore helps him to borrow on comparatively moderate terms. The estate of the ryot in the land is indeed of an inferior kind, and terminable at the end of a certain period; but this interest, limited as it is, satisfies the requirements of a wary money-lender, because it is certain. The British ryot thus enjoys a privilege which is denied even to inamdars in Native States. The practice in Native States of annually farming revenue is again detrimental to the investment of capital in land on the part of the cultivators, while there is a direct incentive thereto in British territory, owing to the thirty years' tenure guaranteed by the Revenue Survey settlement being long enough to secure to the cultivating capitalist a fair return for his outlay. It is indeed true that the assessment is not practically subject to frequent revisions in Native States; but this circumstance does not count for much in the calculations of the cultivator, because the freedom from revision is not guaranteed, and cannot be depended on.

It cannot be, however, denied that the Native States hold out one advantage which the British cultivator does not enjoy. While the ryot here is made to pay his fixed assessment due on his registered holding, irrespective of the actual cultivation, the Native States levy assessment only on the land actually cultivated. This appears to be fair, for land will never be thrown up until it yields a fair crop; and it is harsh if, owing to the diminished productive capacity of the land, or the absence of capital, a cultivator should have to leave his holding fallow, that he should have his difficulties enhanced by having to pay assessment without reaping any harvest in compensation.

A word here about the origin of the indebtedness of ryots will not be out of place. Anything like an exhaustive enquiry of this matter is impossible within the short limits of a minute of this kind. But it may be said, in brief, that I believe those who have searched for the poverty and indebtedness in the different revenue administrations have busied themselves only with the surface, and have left the interior unexplored. Experience shows that among all the multifarious tenures obtaining in different parts of India, not one can be named which pre-eminently guards against the ryot's indebtedness. The conclusion follows that the source of that mischief does not lie in the nature of the tenures. It is my idea that the present revenue system, viewed as a whole, is fair both to Government and the ryots, and that therefore the origin of the existing evils must be sought elsewhere. It appears to me that it is the wide gulf in point of intelligence which separates the Indian cultivator from the other classes of the society that is the source of the vast disparity in their status. The same law by which the whole lower creation is made subservient to the will of man operates in the case of transactions between man and man; and it cannot be but that one more intelligent must prey on another less gifted. The absorption of the gains of the cultivators by the higher classes in this country, therefore, is no strange phenomenon, and is only an illustration of the said law. If this notion of mine is correct, it follows that the remedy to be applied must be such as raises the cultivator in the scale of intelligence, so as to enable him to utilise the powers of nature, and guard against the rapacity of his neighbour. This done, I am sanguine the ryot will prosper, even under the present much-battered revenue system.

Some suitable remedy for ameliorating the condition of the Indian peasantry, by means of fresh legislation or otherwise, is being devised by the statesmen of the day; and I hope their benevolent efforts will end in such a way as would afford a suitable relief to the poverty-stricken and highly indebted land-cultivating ryots, without interfering much with the class of money-lenders, who form no doubt a necessary element of the society.

MAHADEO WASUDEO BARGE.

¹ Sic.

IX.—IMPROVEMENT OF TENANT RIGHT.

MEMORANDUM SUBMITTED TO THE FAMINE COMMISSION SUGGESTING CERTAIN ALTERATIONS IN THE REVENUE SYSTEM OF THE NORTH-WESTERN PROVINCES, BY MR. C. A. ELLIOTT AND MR. E. C. BUCK.

THERE are two points connected with the revenue system of the North-Western Provinces, which we wish to bring to the notice of the Famine Commission, in the belief that the changes we advocate will conduce to the well-being of the people, to the improvement of agriculture, and to the power of the country at large to resist famine.

2. Our suggestions relate to—

- (1.) An alteration in the tenures of the cultivators;
- (2.) An alteration in the system of collecting the revenue from the landlords.

The remarks on the first point are written by Mr. Elliott, on the second by Mr. Buck. Where either of us disagrees in any matter of detail from the views of the other, a note will be entered in the margin showing the nature of the divergence.

3. First, as to the tenures of cultivators. Our suggestions amount to this: (a) that any enhancement decreed by a Rent Court on the rent paid by an occupancy tenant should run till the close of the period of settlement, and should not be liable to disturbance within that period, except on certain specified grounds;¹ (b) that all tenants-at-will should be enabled to obtain an occupancy right in the lands they actually cultivate.

4 (a) —The case of tenants with occupancy rights. When the Rent Code of the North-Western Provinces (Act XVIII, 1873.) was drafted by a committee of revenue officers, the majority of the members of the committee advocated the principle that the rent of an occupancy tenant, when once fixed by a competent court, should not be liable to enhancement within the period of settlement. The Lieutenant-Governor, Sir W. Muir, opposed this, and it was ultimately decided that the period should be only ten years; so that if a landlord sues a tenant, and obtains a decree for enhancement of rent, he cannot sue again for ten years, but can bring a fresh suit, and obtain a fresh enhancement when ten years have elapsed.

5. The grounds on which we advocate a reconsideration of this rule are the following:—

- (1) The relations of landlord and tenant are not in a satisfactory state, and are getting more and more strained. Nothing creates a bitterer feeling of hostility than a suit for enhancement. It is in cases of this kind, more than perhaps in any other, that it is the interest of the State that there should be an end of litigation.
- (2) From an abstract point of view, it is reasonable that, as the landlord's payment to Government is fixed for thirty years, the tenant's payment to the landlord should be fixed for the same period. The same argument under which it is held good that the landlord's payment should be unaltered, and that he should know definitely what return he is likely to get from improvements, apply equally to the tenant. The feeling of the country is in favour of the rent being raised proportionately when the revenue is raised; not of its being raised irrespective of the revenue. The landlord is not entitled, by the theory of our law, to get more from the land than double the revenue.
- (3.) The system under which enhancement suits are decided is in danger of breaking down. The rules for the trial of these suits require an elaborate and careful enquiry into the value of the land, and the prevailing rate of rent in similar lands in the neighbourhood; and they require that the officer (or Rent Court) who decides these cases should have special training in the valuation of land, and should be kept in his district long enough to obtain a minute and broad knowledge of its agricultural conditions.

It has been found impossible to avoid moving officers about to such an extent as to frustrate this intention to a considerable degree; and the elaborateness of the enquiry has resulted in a gradual increase of arrears. We do not think the enquiry can or should be simplified or made more summary; and the only remedy appears to be to diminish the number of cases which can be brought.² That end will be achieved by the alteration we propose.

(6.) The exceptional cases under which enhancement may be sued for, irrespective of the thirty years' period, are:—

- (1) Where dry land has become irrigable under the application of water from any source other than that of a masonry well built by the cultivator at his own expense.
- (2) Where he has added to the area of his occupancy by breaking up waste land, or by taking over land formerly cultivated by another person.

7. Similarly, an occupancy tenant should be allowed to sue for abatement of the rent decreed formerly by a competent court, where irrigable land has become dry through the removal of any source of water-supply which it lies beyond his power to replace: *e. g.*, if a canal is closed, or a masonry well built by the zemindar fails, the cultivator would be entitled to abatement; but not if a kutchra well fails, which, by the custom of the country, he himself ought to replace.

8. As a corollary to this we advocate the declaration by the law of the principle that an occupancy tenant is entitled to build a masonry well in his holding without any alteration being thereby effected in his tenancy,³ or in the landlord's right over the land.

9. (b).—Secondly, as to tenants-at-will, we desire to see the abolition of this tenure on the general ground⁴ that it is injurious to the community at large. Such a tenant cannot be an improving, and must be an exhausting tenant. He is kept in a situation of absolute dependence on the landlord, which takes from him any temptation to improve the land or himself. The soil becomes, therefore, by slow degrees less productive, and the tenant is the first prey to famine. Having no property of his own, and no interest in the land beyond his one year's tenancy, he can get no credit in a bad year, and the failure of a single crop makes a pauper of him.

10. The objection to this is that it would be an act of confiscation.⁵ The number of such tenants is very large, probably they occupy 25 per cent. of the cultivated area in the province (but the statistics on the subject are not yet complete): and many landlords may plead with truth that they bought their estates on the assumption that they could do as they please with such tenants⁶, rack-rent them, eject them, and extort different kinds of service from them, over and above the nominal rent. Some compensation should be given for this loss.

11. We believe that this can be provided for, and that the tenants-at-will would, for the most part, be ready to pay a fair sum for the privilege of an occupancy right,

¹ (And to cause them all to be settled once for all, at one time in each locality.) E. C. B.

² I agree entirely in paras. 1 to 8. E. C. B.

³ I advocate it on the ground that it is the position of the cultivating community which is to be raised, and that it is desirable to make the North-Western Provinces' system approach as nearly as possible to a ryotwari system. E. C. B.

⁴ I doubt if all landlords would agree. Take the case where probably most opposition would be raised, an estate held by an improving European planter. Some means must be found for allowing him to raise his rentals in return for improvement effected by his capital indirectly as well as directly expended for the benefit of the cultivators (*e.g.*, in the construction of roads, bazars, &c.) E. C. B.

⁵ But this applies to the rents of all tenants, not specially to those of tenants-at-will, and therefore it does not directly affect the position of the latter. E. C. B.

¹ (It being of course understood that an opportunity is given, once for all, of disposing of all rent questions within a reasonable time after assessment of revenue.) E. C. B.

we need not at the present stage go deeply into the details of such a scheme. It is enough to say that our proposal would not be that tenancy-at-will should be abolished at a stroke. It would be sufficient to provide a means by which each tenant-at-will should be able to raise himself to the status of an occupancy tenant by contracting to pay, for a certain number of years, a certain increase per acre to his existing rent. What that increase should be might be fixed roughly for each district by a commission, consisting of, say, a covenanted civilian, a Native deputy collector or tahsildar, and a leading landowner. All this could be worked out afterwards; but if it were established that, for instance, every tenant-at-will could secure occupancy rights by paying four annas an acre above his present rent for ten years, then we believe that all such tenants-at-will as are thrifty, resolute, and industrious would accept the offer, and would raise themselves, from being a source of danger

to the State and injury to the soil, to the higher status, in which they would have every stimulus towards good cultivation and improvement¹, and would be able to stand alone without State support in times of drought and famine.

We do not think this change would be willingly assented to by landlords. They would lose much of their influence over their tenants-at-will—the power of ordering them about, and of compelling them to perform various acts of service; and the mere compensation they would receive for the loss of the right to rack-rent would not reconcile them to the elevation of the tenant-at-will from a servile to a free tenure. But we think that, in the North-Western Province, at least, the political danger of giving such offence to the proprietors would be slight, and would be outweighed by the economic advantages of the reform we propose.

20-11 '78.

C. A. E.

NOTE ON COLLECTION OF LAND REVENUE, BY MR. E. C. BUCK.

Under the system now in force the produce of land in the hands of occupancy tenants¹ is primarily divided into three sections or shares, of which two are practically constant in amount, and the third variable—

- (1) *Government share*, which is fixed for a term of years.
- (2) *Landlord's share*, which is ordinarily fixed for a term of years (the enhancement to which under certain conditions it is subject need not enter into the present discussion);
- (3) *Cultivator's share*, which varies from season to season with the amount of produce.

If the land providing the produce is good, and a plentiful supply of manure and water and other circumstances enable good crops to be ordinarily raised independently of variations of season, there will usually remain, after the deductions required for Government and landlords, a sufficient surplus to provide the cultivators with enough for the maintenance of themselves, their families, and cattle, and for the payment of contingent agricultural expenses,² as well as sometimes an additional sum for expenditure on marriages, luxuries, and jewels (the Native's savings bank).

If the variations of season are not exceptionally great, cultivators can, under these circumstances, usually make up for the deficiencies of a bad year with the surplus of a good year.

But if, on the contrary, there is in any tract or cultivator's holding a large proportion of poor land, or great defect in the conditions requisite for the maintenance, under unfavourable circumstances of season, of fairly good crops, then the oscillations of outturn must not unfrequently fall far below the amount required by the three sharers—Government, the landlord, and the cultivators. But since the first two sharers claim under all circumstances their full share, the whole of the deficiency must be borne by the last.

Exceptional failure of season may cause the same results even on fairly good land. In fact, it will be right to conceive the whole area of land held by occupancy tenants as divided into classes or grades, of which the lowest is violently affected by slight variations of season, and the highest slightly affected by violent oscillations of season. Those whose land consists entirely or chiefly of the lowest class, must be continually placed in a very different financial position from those whose land is entirely or chiefly of the highest class. And yet they are treated on the same system—in theory that one of the three sharers whose section is liable to variation is expected to keep for a year of deficiency the surplus which in a year of excess remains after satisfying the demands of the superior sharers, as well as the requirements of agricultural labour (which include his own sustenance).

As a fact, he does not; and it is doubtful whether in holdings subject to violent oscillations of outturn we should expect him to do so. There is probably no agricultural land in England which is liable to such extreme vicissitudes as the greater portion of the land of this country; for it is asserted that there the produce of an acre of wheat varies between extremely small

limits of which the minimum far exceeds the Indian average. In India the produce of an acre may be, and often is, insufficient to recompense the seed.

It follows that even a thrifty cultivator on land of oscillating produce must be beaten by a continued series of unfavourable seasons of which the produce is insufficient to satisfy the requirements of the three sharers. But as the cultivator of India is as a fact unthrifty, so much the more is it unlikely that he can raise funds from his own resources to meet the requirements of those two sharers who permit no abatement of their shares, as well as to provide sustenance for agricultural labour.

We may suppose the case, then, either of thrifty cultivators who have been forced by bad seasons to part with their savings, or unthrifty cultivators who have no savings. A year may arrive when the produce is sufficient to provide for the demand of the two superior sharers, but insufficient to satisfy in addition the requirements of the third. Then either agricultural labour must be stinted, or funds must be obtained from an outside source. But a more extreme case may occur: outturn may dip so low as to be even insufficient to provide for the demands of the superior sharers, which means, in other words, that there is nothing for agricultural labour, and not enough for the superior sharers. Then there is no option. Funds must be obtained from outside, both to satisfy the deficiency in the amount required by the superior sharers, and also to keep the cultivators and their subordinate labour (family and cattle) alive.

The result has naturally been the establishment of a large number of agricultural banks, from which the deficiency of bad years is advanced on the security of the crops of future years, which are mortgaged by the cultivators for their loans.³

The very fact that the produce of land on which loans are chiefly required is subject to violent oscillations and periods of long depression renders the security ("crops of future years") uncertain and high interest charges necessary; and it follows, as a natural consequence, that the cultivating classes are, in a very large proportion,⁴ continually in debt to the banks, a fact which signifies also that they are reduced to a low standard of living, and that agricultural labour is not kept up to the full level of vigour required for the proper tillage of the land.

The question which it is the object of this note to raise is, whether the condition of the cultivating classes will be ameliorated, the tillage of the land improved, and the produce of the country increased, by allowing the share of the superior sharers to vary as well as that of the inferior sharer. To do so is opposed to European

¹ I agree in the object advocated in paras. 9 to 11, but consider that the issues raised will require much discussion.

J. C. B.

² The bankers or holders of the capital are the class generally known as money-lenders or banyas; but to a great extent also the landlord section of the agriculture community, who utilize their share of the produce in making advances to the cultivating classes.

³ I find that the proportion which I obtained for 1,000 cultivators in the Cawnpore district is fairly maintained in the replies to the Famine Commission queries, viz., that 25 per cent. were free from debt, 50 per cent. continually in debt, and 25 per cent. irretrievably in debt.

¹ Proposed alterations for the relief of occupancy tenants (and cultivating proprietors.)

² (These may be summed up in the more concise phrase "requirements of agricultural labour.")

systems, but since produce in Europe does not oscillate in the same way as produce in India, the argument has of itself little force.

It would, in the first place, be satisfactory to ascertain whether the business conducted by those who undertake the management of the banks results in an average net profit which exceeds the ordinary profit of investments, and what becomes of the net profits which they obtain; for, if the whole of their capital is continually invested in maintaining agricultural labour, there would really be little occasion to interfere.

To notice the last point first. Insufficient information at present exists as to the history of that portion of the produce which remains as net profit in the hands of the banking community, *i.e.*, both as to its amount, and also as to what extent it travels again in a circle to the land. There is, on the one hand, the cry that the baniya has become fat on the labour of the people, and, on the other, the assertion that the produce they collect merely comes back in some other form to the land.¹ The truth probably lies between the two. There are indications that a certain portion (and in some parts of the country a large one) has been diverted from the land to commercial uses, another (possibly a small one) to unproductive expenditure, such as the construction of temples, and a very considerable portion to the purchase of landlord rights in land. The latter expenditure, in so far as sales of landed rights are due to failure of produce and interest on loans, is simply a return of capital to the land; but in so far as they are due to unproductive expenditure (such as feasts and largesses to non-labouring classes at marriages) is a diversion of capital in an unproductive direction, and must be included in considering the objects upon which the profits of banking capital are expended, notwithstanding that the diversion from the land is made by the landlord who sells, and not by the banker who buys, the landed interest.

The second point is, whether the average net profit of the bankers is abnormally high (and in dealing with the question the excessive though ordinary rates of interest of 30 to 40 per cent must not be confounded with net profits, since the rates do not represent realised profits any more than the sum total of a London tailor's ledger represents the sum which he eventually recovers from his customers). Net profits probably have a percentage varying within wide limits at different times and in different hands, and there is too little information available on the subject to admit of any assertion beyond an expression of opinion that minimum profits are ordinarily not less than 12 per cent., below which rate it is difficult to obtain money in the market, and that it would possibly be lower but for the possibility of extreme loss under exceptionally unfavourable seasons.

Now, can Government, by undertaking a portion of the banking business itself, and by utilising for the purpose some portion of the share of the produce which it receives, reduce the interest which is ordinarily charged on agricultural loans, and at the same time secure to the whole community such profits as are usually given on Government securities, say 5 per cent., at which rate it could probably borrow funds to replace the deficiency in revenue?²

There are two ways in which Government might be asked to bank with occupancy cultivators, *viz.* :—

- (1.) By making cash advances.
- (2.) By granting suspensions of rent with interest.

The first method is permitted by the *Takavi* Act for works of improvement only (such as masonry wells), but is not permitted for purchase of seed, bullocks, or food. Any independent system of cash advances for such purposes would require an enormous and costly machinery, and, in any case, not being concerned with the collection of land revenue, need not be discussed in

this paper. The second method is more simple, and can be effected by an alteration in the system of land revenue.

The method having been actually employed in the North-Western Provinces to a limited extent, will best be understood by a brief account of the way in which it has been applied, and of the results which have been obtained.

Six years ago the attention of Government was called by myself, as Settlement Officer of Cawnpore, to the great loss which had ensued to the cultivators of a tract of country which had been desolated by a hailstorm, and a suggestion was made that a clause should be inserted in the Rent Act of 1873 permitting, under such circumstances a prompt remission or suspension of land revenue, accompanied by a proportionate remission or suspension of rent. The case was corroborated by a similar occurrence in the Basti district, where, although nearly 1,000 villages were devastated by a hailstorm, the collector could propose no relief, *because it could not reach the tenants*.

In the select committee on the Rent Bill the proposal was approved, on the ground that it was just and right that, if Government granted relief to the landlord, it could require similar relief to be extended to the cultivator; and a section (23) was inserted, not indeed to the effect that if relief was given to the landlord he should extend it to the cultivator, but that relief *should* under certain circumstances be given as a *right* to the cultivator, and that similar relief (based on the proportion of rent to revenue) should be given to the landlord.

Under this section the following remissions and suspensions have been made in three years—

	Rent, Rs.	Revenue, Rs.
Remissions	2,08,000	1,11,000
Suspensions	89,000	42,000

the cases in which relief has been given having been almost without exception those in which loss of produce has been occasioned by hailstorms.

Thus has a most important principle been actually introduced into the revenue system, by which Government has admitted the claim of cultivators to a portion of that share of the produce which has hitherto been demanded in full both by the landlord and Government; in other words, the share of the produce belonging to the superior sharers has been allowed to vary in favour of the inferior sharer, who had hitherto been made to bear the whole of the deficiency due to vicissitude of season.

The system, as introduced, has one serious flaw. It cannot be extended without embarrassment to the superior sharers (both Government and the landlords), for it will at once be observed that, instead of lending on interest to the injured cultivators, as the village banker might have done, Government made a free gift of one portion of the rental, and a loan without interest of another portion, in which gift and loan the landlords were forced to share.

When, therefore, in the famine year of 1877, the question was mooted whether the section could or should be applied for the relief of cultivators whose crops were destroyed by drought, the idea was at once abandoned, and the agricultural community were surprised¹ to find that Government, who came forward with such liberal gifts and loans in their lesser calamities, refused to give them aid on any terms under the supreme affliction of drought.

The obvious improvement necessary to give efficiency to the system of relief, is to permit suspensions of rental with interest, provided that the interest be sufficient to secure to the superior sharers a guarantee against loss.

The argument now returns to the issue whether Government can afford to charge a smaller interest than the existing agricultural bankers.

¹ I should hardly agree in this phrase, nor do I quite follow Mr. Buck in the importance he attaches to the alteration made by section 23 of the Rent Act. It has always been the practice in the North-Western Provinces to remit or suspend revenue on the occasion of any great failure of the crops, and there has always been a tacit understanding that the proprietors should similarly remit or suspend the rent. By the section referred to, the tacit understanding was turned into a legal obligation. In the drought of 1877 the old practice was followed. As far as my information goes, I am inclined to think that the suspensions granted, which amounted to 45 lacs in November and December 1877, were as large as previous precedents should have led the proprietors to expect. C. A. E.

[¹ See extract, *Quarterly Review*, quoted by Hyndman, XIXth century.]

² Say that there are 4 millions of cultivators* in a province paying 80 millions of rupees as rent (these are figures approximating to those of the North-Western Provinces), and that two millions owe not less than 100 rupees each to the bankers. The total agricultural debt, *i.e.*, the extent to which future crops are mortgaged, would be 200 millions of rupees or 20 millions sterling. The revenue of the province may be assumed to be 50 millions of rupees or 5 millions sterling per annum, which, capitalized at 5 per cent, is 100 millions sterling, so that, under the figures assumed, the capital in the hands of Government is five times the agricultural debt. These hypothetical figures will give some indication, however remote, of the possible relation of the debt by the cultivating section to the capital or share of produce in the hands of the Government.

* Occupancy and non-occupancy.

Three points must be considered:—

- (1.) What are the additional duties which will have to be undertaken by Government, and what will they cost?
- (2.) What will be the character of the security as compared with that obtainable by the existing bankers?
- (3.) How far will the risk be shared by the landlords (or other superior sharers)?

1. It must be at once admitted that a very much closer acquaintance with agricultural circumstances must be acquired by the officers who are charged with the duty of collecting land revenue. Under the section which has permitted relief for damage by hailstorms, a prompt and careful enquiry has always been required, and a similar investigation of the circumstances of each case would be necessary if the system were extended. It may be explained at once that it would be considered impossible to undertake individual relief to every cultivator under all circumstances of personal loss, and that the existing money-lending machinery must still be utilized for relief under pressure caused by minor oscillations of produce; and it may even be suggested that, taking hailstorms as a precise instance of calamity, extension of the relief system would be made in an upward rather than in a downward direction i.e., relief would be more usually offered when the calamity was of greater rather than when of less weight than a hailstorm. At the same time, the extension of the system in any form could not but involve the employment of a large portion of the revenue staff in the constant investigation of circumstances connected with the land and its produce, a measure which would doubtless require some extra expenditure. It is true that expenditure can be minimised by the reduction of the cost of judicial work, in which much saving can be effected, and by utilizing Native officials for the performance of many duties which they can perform practically as well as the expensive civilians now employed on them, and perhaps also by other reforms in the administration of a more general character. But assuming that there will still be some extra expenditure to meet, it might properly be covered by the interest charged on the suspensions which may be made under the proposed system, so far, that is to say, as the new duties are necessitated by it.

There are, indeed, other reasons for requiring revenue officials to become acquainted with the circumstances of land and its cultivators, which might modify any view entertained of the necessity of charging the extra expenditure on the interest of suspensions; but it is desirable to point out that, if the cost of establishment is a bar to the proposal, so much at least may be allowed as could be covered by a reasonable interest on suspensions.

The next point to consider is the value of the security. This is the best that can be given, viz., a lien on the crops of the land, and differs essentially from the lien obtained by the ordinary money-lender (other than a landlord granting a loan in the form of suspending rent), in that, whereas his lien is outside and in excess of the hypothecation of the crop for rent, this lien, being on account of a debt included in the rent, is inside and not in excess of the hypothecation of the crop for rent. This advantage is shared both by the landlord who suspends rent and by the Government who suspends revenue.

But at this point we are led to a consideration of the third question, as to the share of the landlord in the risk, and it will at once be seen that Government has a firmer security than the landlord for the recovery of the loan. It is clear that both of the superior sharers join in advancing the loan (in the form of suspension), of which, roughly speaking, the landlord subscribes one half and the Government the other half, but whereas the cultivator alone is responsible to the landlord, both the cultivator and the landlord are responsible to Government, and the interests therefore of the landlord in the land become security to Government as well as its future crops.

Assuming this position, which as regards security is the one adopted by section 23, the superiority of the guarantee under which Government grants its loan—obtained by the present money-lending—is at

There is therefore not the same necessity for the high interest by which money-lenders are induced to pay to compensate them for the risk of default by debtors who do not pay. In broad terms it may be asserted that the security is double

landlords are made to take is that naturally to their position. They are

joint-sharers with Government in that section of the produce which cultivators pay as rent, and they should be joint-sharers in making the loan which is required for maintaining agricultural labour. Their security is, it is true, less full, but the difference between the security which they obtain and that which Government obtains is practically caused by the fact that Government is making a loan to them as well as to the cultivators; their revenue is suspended at a time when, unless they are large capitalists, it is difficult for them to find cash with which to pay it, and the arrangement is an advantage to them unless they are independently rich men.

But rich capitalist proprietors are landlords and money-lenders in one person, and exercise their right as landlords in forcing usurious loans on cultivators who are their tenants, and there is no class for whom forced suspensions of rent at reasonable interest are more needed than those who are the tenants of capitalists. Poor zamindars, especially those who cultivate their own lands, will, for their own sakes, ask for suspensions, and be glad to pass them on to cultivators; but rich proprietors object to relief, because it destroys their power of extracting large profits from the produce.

Some few years ago I made a rough calculation that in a certain tract one-eighth of the rent was probably advanced (by any proprietors who could afford it), in the month of October, on account of seed, and recovered six months after, in March, at 37½ per cent. interest. The custom prevailed widely in many districts, and was effected by the landlord granting a "suspension of rent," for which the above interest was charged. The general necessity for the loan could be (and subsequently was) greatly avoided by the re-adjustment of revenue instalments. But it was found that moneyed landlords had, as a rule, no wish to have the instalments changed, and begged in many cases that no change might be made. It is easy to see why. They would lose a lucrative investment. The interests of cultivators were, however, taken into consideration, and a change was made which (so far as it was really carried out in each district) practically resulted in a loan by Government to cultivators, free of interest, for which they were formerly charged 37½ per cent. I venture to assert that, in these provinces alone, a full and proper re-adjustment of instalments, based upon the seasonal outturns of each locality, would result practically in short-term interest-free loans to cultivators of one or two millions of rupees in each year. Much has already been effected to bring about this result, and much more can be done if the revenue staff are required to learn their villages.

The measures which have been introduced for the re-adjustment of instalments are very much akin to those which are now proposed, and the same necessity exists in the present case of Government enforcing a system which will make relief begin with the cultivator and not with the zamindar. If suspensions of revenue are only to be given when the landlord asks for them, the pith of the project will disappear, and no guarantee will remain that the cultivator will receive relief when really requisite. The principle of section 23 must be adopted, which is to oblige the zamindar to give relief to the cultivator on moderate terms, and then to grant him proportionate relief on similar terms.

The present proposals are not unlikely to meet with disfavour on the ground that they will embarrass finance. It does not, however, appear that they need do so. Government, as the chief proprietor and farmer of the country, ought to keep a working capital in its hand on exactly the same principle that a famine fund is proposed. A certain amount of money must be borrowed each year, of which the interest will make up the deficit in the revenue; the loan of each year will be gradually paid off by the instalments of produce paid by borrowing cultivators in future years, and as it will not ordinarily be the case that the same set of cultivators will require to be the borrowers in successive years (any more than that a hailstorm should follow the same tract in successive years), so it will not ordinarily be necessary or desirable to allow the debt of one year to run for a long term.

Suppose, for instance, that in a province of which the revenue is 500 lakhs of rupees, and the rent 800 lakhs of rupees, and that 10 lakhs of revenue (and 20 lakhs of rent) are suspended each year for a term not exceeding five years, then the working capital would not exceed 50 lakhs, and if instalments were recoverable on a fifth each year, need not exceed 30 lakhs; viz.:

	Amount to be borrowed in excess of instal- ment.	Instalment re- coverable: one- fifth of loan.
1st year - - - -	10 lakhs.	...
2nd „ - - - -	8 „	2 lakhs.
3rd „ - - - -	6 „	4 „
4th „ - - - -	4 „	6 „
5th „ - - - -	2 „	8 „
6th „ - - - -	...	10 „
Total - - -	30 lakhs.	...

The chief feature in the reform which it is proposed to make, is that Government and the landlord community should accept some portion of the responsibility occasioned by oscillation of produce on their own shoulders. They are the proprietors of the soil, and it is very hard that they should throw upon the tillers of the soil the whole of the financial difficulty occasioned by the extreme vicissitudes to which the outturn of so large an area of the cultivated land in India is exposed. The poor tenants have often to starve themselves and their land in order to meet the difficulty, and having been then thrown into debt to the village bankers, are kept by high interest in a life-long slavery, at a low standard of living, and can seldom reap themselves the benefit of good years and good prices.

While we accuse *them* of improvidence are not we equally open to the charge? Have we as landlords made any attempt to save any portion of the produce of a good year (or of its value) to meet the deficit of a bad one?

And is it not the first duty of the supreme landlord, if only as a matter of financial economy, to take measures to keep agricultural labour up to a full standard of strength, so that the tillage of the land by which the exchequer is filled may be made as effective as possible?

There is, of course, a line below which the interference of Government will cost more than it gains, and at that line it must stop. The line is not yet ascertained, and cannot indeed be marked out until our revenue officers know much more of the agricultural circumstances of the land than they do now. Steps towards it must be made with care and by slow degrees. The first approaches were made in the modification of revenue instalments (admitting still of much further advance), and in the principle introduced by section 23, and the time and opportunity appear now to have come to make more rapid strides for the relief of the cultivating community, by whose labour the wealth of the country is supplied.

As far as the North-Western Provinces are concerned the law requires but small alteration to bring the new system into force.

To section 148, Act XIX., 1873, add the words "arrears of revenue may be charged with such interest as the Local Government may impose," and to section 25, Act XVIII., 1873, add the words "and provided that no suspension of rent or revenue shall be granted without interest, except with the sanction of the Local Government"—AND THE THING IS DONE.

To carry the system into effect, however, much reform in executive administration is necessary, and what direction reform should take I will not attempt to discuss further until the principle underlying the major proposition for the alteration of the system of collecting land revenue has been acknowledged as right in policy.

22-11-'78.

E. C. B.

I agree for the most part in what Mr. Buck has written, but his paper does not leave on my mind a definite impression as to what he would wish to have

done in the different circumstances that may arise. We have to deal with two classes of cases—

- (1.) "Slight variations" in the outturn;
- (2.) "Violent oscillations," or, I should prefer to term them, catastrophic failures of the crop.

As to the first class, I should say that we ought not, as a rule, to meddle with them. The principle should be applied here of taking good years with bad; the cultivator's ordinary credit with the *baniya* should tide him over such bad seasons as these. But in cases where it is evident that this principle does not hold good, as, for instance, in the Jhānsi Division, where our settlement system appears to have broken down, the Government might take power to hold an annual revision of the rent-roll, following the method adopted in Bombay and Madras, and to impose a fluctuating assessment to vary with the rent-roll. This revision should turn, I think, not on the annual variation of the crop, which it is beyond our power to appraise in an equitable and regular manner, but on the area cultivated, which admits of little or no dispute.

As to the second class of cases, the existing law is very general in its terms, but has hitherto been applied only to local catastrophes, such as loss by hailstorms. Its principle could no doubt be applied to far-reaching catastrophes, like a general failure from drought; but the present rules, which require a minute inquiry into the loss in each field, would not be applicable to such a calamity. But still, to take a concrete case, it might have been asserted, without much risk of error, that over large tracts of country in the North-Western Provinces of Oudh the whole kharif crop of 1877 was lost. To exact the rent from the cultivators in such a year would have been harsh and unwise. But does it necessarily follow that to exact the revenue from the proprietors was harsh and unwise? Certainly not, so far as they were wealthy men and able to pay, either out of cash in hand, or out of cash borrowed at ordinary rates of interest: as certainly it was harsh so far as they were forced to borrow at exorbitant rates or to mortgage. But then there is another side to the question, *viz.*, the necessity that Government is under of knowing beforehand with some accuracy what its receipts are likely to be. Mr. Chapman has told us that in November and December 1877, 185 lakhs of revenue were collected in the North-Western Provinces and Oudh, and that the Government would have been put to great straits if that money had not come in. The prospect of recovering it afterwards, with 5 per cent. interest, would not have been sufficient; it would shake the credit of Government too deeply if it had to go into the market at a short notice to raise a loan of two millions. It seems to me, therefore, that in such cases as these Government ought to have the power of declaring that the rent must be suspended by the proprietors—that is, that Government will not give them the assistance of its courts towards collecting rent by distraint or decree; but that it should not, therefore, be bound to suspend the revenue, but should continue to collect it on the present system, not putting on any severe pressure, nor proceeding to the extreme steps of temporary alienation or transfer, but still should collect all that it can. I would, therefore, modify section 23 of Act XVIII., 1873, by providing that, in cases of general failure from drought, the local Government shall have the power to proclaim that the ordinary procedure of the courts in the matter of arrears of rent shall be in abeyance, but that it should not necessarily follow that the same procedure should be adopted in the matter of arrears of land revenue.

I may add that I am opposed to the principle of charging interest on suspended arrears. The amount to be thus collected would never amount to an asset large enough to be worth considering financially, while the calculation of it would be a constant worry and source of annoyance. In Bombay the system was tried for many years, and has now been given up, as I understand, on these grounds.

28-11-'78.

C. A. E.

NOTE ON A MEMORANDUM SUBMITTED BY MR. ELLIOTT AND MR. BUCK TO THE
FAMINE COMMISSION, SUGGESTING CERTAIN ALTERATIONS IN THE REVENUE
SYSTEM OF THE NORTH-WESTERN PROVINCES, BY MR. H. S. REID.

1. Mr. Elliott and Mr. Buck propose (1) that once the rent of an occupancy tenant has been enhanced by a Rent Court, the landholder shall be precluded from making any further enhancement throughout the term of settlement. *Ex gr.*, The settlement is made in 1870; the landholder, whose *jama* has been enhanced by some 50 per cent. by the Settlement Officer, applies in 1872 to the Rent Court to enhance the rent of his occupancy tenants. It may be that the Rent Court *can't* enhance up to that amount, but assume it does. For the remaining 28 years the settlement has to run the proprietor of the land will not be able to effect any further enhancement.

2. It is true that, of the members of the Committee appointed to discuss and draft a Revenue and Rent Code for these Provinces, the majority were in favour of the proposal which has now been revived. But the views of the minority, which were formed entirely independently of, were shared by Sir William Muir, the great Revenue authority of the day.

3. I propose to discuss the grounds on which the proposals, rejected in 1872, are based, and at the same time attempt to show that the proposals should again be disallowed.

4. The relations between landlord and tenant, it is affirmed, are not in a satisfactory state, and are getting more and more strained; and nothing creates a bitterer feeling of hostility than a suit for enhancement. The former part of this assertion is quite true. There can be no doubt that between *zemindars* and tenants, not only does a spirit of hostility often exist, but the one party is ever on the look-out to circumvent the other. We have virtually told the tenant-at-will that, if he can only hold on for 12 years without accepting a terminable lease, he will develop into an occupancy tenant. We tell the *zemindar* that, if he does not prevent the accrual of occupancy rights by turning out his tenant before he has held for 12 years, or by compelling him to execute a lease for a term of years, he will lose part of his rights as proprietor in the land held by such tenant. Undoubtedly this in itself is an unsatisfactory state of things, but it is the result of our legislation. I was so much impressed with the evils which must inevitably result from the operation of the law, that I advocated just the opposite course to that proposed by Messrs. Elliott and Buck, *viz.*, that, for the future, permissive occupation should in no way work towards the creation of an adverse right: in other words, that the 12-years' occupancy rule should be struck out of the Act, rights which had accrued under Act X of 1859 being of course maintained.

5. I am aware that any such proposal as mine would, at first sight, be objected to as being a retrograde step. But there can be no doubt, at any rate, that the chief cause of friction between landlords and tenants would be removed, and in years of distress and famine the former would help the latter far more readily than they do now. It is notorious, that in bad years a *zemindar* who has the means will help the tenants-at-will, while at the same time he will do all he can to ruin the obnoxious occupancy tenant. I believe that no mode more calculated to make the hostility between landholders and cultivators more deep-seated and rancorous than the proposal to deprive the former of the rights which he has always exercised in regard to the latter could be devised.

6. Before Act XVIII of 1873 (the North-Western Provinces Rent Act) became law, the landholder could enhance the rent of his occupancy tenants year by year. (I must note that I am speaking of the tenants who had been vested with the right of occupancy on the strength of 12 years' occupation by Act X. of 1859, and not of the men who, before the passing of that Act, were known as *maurusi dasamis* or "hereditary tenants.") The consequence was never-ending litigation. It was thought advisable, by the conservative minority in the Nami Tal Committee, as well as by Sir William Muir, to restrict the landlord's power to enhance to periods of 5 or 7 or 10 years. Sir William Muir fixed the term to 10 years, and that term was, we may assume, after careful deliberation in the Legislative Council, eventually deter-

mined on. The proposal to allow no enhancement during the period of settlement—a proposal which ignored *in toto* the landholder's rights—was opposed on the ground that it was unfair to the landholder to deprive him at one fell stroke of the right to enhance he had hitherto possessed; that the tenant received sufficient protection when the landlord's power of enhancement was confined within reasonable limits of time; and that the abuse by the landlord of his right to enhance was sufficiently provided against by the amendment they recommended. It seemed to them simply monstrous to ignore the landlord's just and legitimate rights. They contended that the landholders had engaged to pay the Government demand for land revenue for a long term of years, on the understanding that during the term of settlement the advantages resulting from rise in prices of agricultural produce, improved communications, &c., should be enjoyed by them—advantages which would be transferred bodily to the tenant under the proposal made by Mr. Elliott and Mr. Buck, who appear to ignore the fact that we have not a *tabula rasa* to deal with—that is, that there *are* "vested rights" belonging to the party whose position they assail.

7. It is certainly desirable in the interests of the State that there should be less litigation between landlord and tenant, but it is hardly right that this result should be secured by the sacrifice of the just and legitimate rights of one of the parties. Besides the injustice of sacrificing such rights, the impolicy of the course proposed must be recognized. The result of these measures would be the complete alienation of the good-will (whatever may be still left to us) of the most influential class in the country—the landed proprietors, from the *Rajah* who is chief of his clan to the powerful proprietary brotherhoods, members of whom are compelled to cultivate as tenants-at-will in other villages, owing to the existence on their estates of a numerous body of cultivators whom Act X. of 1859 has clothed with occupancy rights.

8. I very much doubt whether it is the case that the feeling of the country is against rents being raised when revenue is not raised. Any such feeling can hardly exist in the permanently-settled districts, nor does it exist, I believe, in any part of these Provinces. Were it so, the objection that the revenue has not been enhanced would not be raised only in application brought immediately after the declaration of a revised assessment. The landlord frequently makes enhancement of revenue a ground or excuse for enhancement of rent, irrespective of all other considerations; and the tenant, on his part pleads, irrespective of all other considerations, that as the revenue has not been raised, his rent should not be enhanced. But this fact does not prove that the feeling of the country is against enhancement when there are other and valid grounds for it. Nor does it appear to be correct to say that the landlord is not entitled by the theory of our law to get more from the land than double the revenue. Our law nowhere enunciates any such theory. In practice we take half the assumed rental as revenue, but under the old rules which were superseded by the Sahāranpur rules, and which might have been revived under our revenue law, we took two-thirds of the rental. Our theory of and also our practice in assessment is not to fix the rental at double the revenue, but to take as revenue a certain portion of the proper rental of the time the assessment is made—a very different matter. It is true that the annual value of an estate has been defined in the Revenue Act to mean double the revenue—an interpretation which is opposed to fact, and has been assumed to be true merely with the object of facilitating the estimate of the *patwari's* cess. It is notorious that the real annual value of an estate is almost always more or less than double the revenue. It is a mistake to build a theory on a manifestly incorrect assumption. The landlord for his land is entitled to get all he can get fairly. The theory is utterly ignored in the rules prescribed for the guidance of our Rent Courts in the disposal of applications for enhancement.

9. Those rules, which were drafted for the most part, I believe, by Mr. Elliott and Mr. Buck, are elaborate.

They throw very great difficulties in the zemindar's way where he applies under the rent law to enhance his tenants' rental. But it does seem cruel to make the difficulties in the way of enforcing a right, which difficulties we ourselves have created, a reason for obliterating that right. The remedy for the evil would be a simplification of the rules.

10. If it be a fact that the elaborateness of the enquiry (which all tells against the landlord) has resulted in a gradual increase of arrears, have more courts, or a simpler procedure—less objectionable remedies than diminishing the number of cases which can be brought (“that end,” Messrs Elliott and Buck observe, “will be achieved by the alteration we proposed”) by depriving the landlord of his legitimate rights. It has not been proved that the zemindar has not that right.

11. Mr. Elliott and Mr. Buck would allow enhancement where—

- (1) dry land had become irrigable under the application of water from any source other than that of a masonry well built by the cultivator at his own expense;
- (2) the tenant has added to the area of his occupancy by breaking up waste land, or by taking over land formerly cultivated by another person.

12. I would not allow enhancement in the first case, in which, indeed, it can be enforced only by a violation of both the old and new principle, recognized by Rent law, that enhancement of a right of occupancy tenant's rent shall be allowed only where the value of the produce or the productive power of the land has been increased otherwise than by the agency or at the expense of the tenant. It cannot be supposed that the tenant gets the water for nothing. He certainly has to pay a fair price for it if he gets it from a Government canal. There is this difference between the old and new Rent law; under the former (Act X of 1859) the rent of a tenant could not be enhanced if the value of the produce had increased at his expense; under the latter (Act XVIII of 1873) it can be raised after 10 years. On this point I would recommend that the new law be brought into conformity with the old.

13. In regard to the other two grounds on which Mr. Elliott and Mr. Buck would allow of enhancement, I would observe that the landlord would not in either case apply for enhancement of rent, but for the delivery of a *kabuliya* (counterpart of a lease). The rent of land on which no rent has been paid or is payable by an agreement between the parties cannot be enhanced, and one cultivator cannot take over land from another on the terms agreed to between the landlord and the original tenant, the occupancy right not being transferable.

14. Mr. Elliott and Mr. Buck would allow a tenant to sue for abatement where irrigable land has become dry. But would they allow a corresponding reduction in the revenue where the revenue had been collected on such land at irrigated rates? If they would, I would not object to the rule, if it is required. I doubt whether it is, for by section 15 of the Rent Act an occupancy tenant may apply for abatement of his rent if the value of the produce of the land he holds has been decreased by any cause beyond his power.

15. I do not object to the declaration by the law of the principle that an occupancy tenant is entitled to sink a masonry well in his holding without any alteration being thereby effected in the tenant's or in the landlord's right over the land, except, of course, where there was an express agreement to the contrary. I doubt, however, whether such a declaration is necessary. The law regards the construction of “improvements” (tanks, wells, drainage works, &c.) as permissible to a tenant; otherwise the award of compensation to the tenant would not be provided for, or the ejectment of a tenant without payment of compensation forbidden, for compensation would not be awarded for a work constructed in violation of the existing law or custom.

16. Mr. Elliott and Mr. Buck would permit all tenants-at-will to acquire right of occupancy. They admit that it would be “an act of confiscation” for which the landlord must be compensated by the tenant, and then propose almost impossible conditions—conditions absolutely impossible if the zemindars are the tyrannical, rack-renting, grasping landlords they are assumed to be. Where the tenant-at-will is in a position to purchase the right of occupancy either by payment of a lump sum, or by the payment for a term of years (10 years is the term proposed) of an enhanced rent, he must have been treated with a certain amount of leniency and consideration, or the rent he is paying be moderate enough to

17. The principal arguments on which the conversion of tenants-at-will into occupancy tenants are that the former are kept in a situation of absolute dependence on the landlord, they have no inducement to improve the land, which becomes gradually less productive, and they are the first prey of famine; having no property of their own, and no interest in the land besides their own year's tenancy, they can get no credit in a bad year, and the failure of a single crop makes paupers of them. But is it not the case that the landholder, whenever he has the means, (and the landholder whose tenants are mostly tenants-at-will, is *ceteris paribus*, better off than one who has right-of-occupancy tenants or tenants at fixed rates, and the object of the proposals before us are to make all tenants tenants at fixed rates for the term of the settlement) assists his tenants-at-will and keeps them on his estate? On the other hand, he does what he can to get rid of occupancy tenants; a class which, as a rule, the landlord utterly abhors. I would point out that the right of occupancy is not transferable, and therefore it affords no security for the repayment of a debt.

18. It is allowed that it would be an act of confiscation to convert tenants-at-will into tenants with right of occupancy. But would it not be equally an act of confiscation, though within more circumscribed limits, to deprive the landholders of all the advantages arising from rise in prices of agricultural produce, improved communications, &c., which they have hitherto enjoyed, and to confer all such advantages on tenants whose occupation of the land is of comparatively recent date (I am alluding to the *creations* of Act X of 1859), and whose claim to continued occupation of the land had no existence before the passing of that Act. I do not deny that there are certain classes of tenants who have a strong claim to be protected, *viz.*, the old (the real) “hereditary” tenants whose rents were often exempted from enhancement during the term of last settlement by an express provision in the village administration paper (*wajib-ul-arz*), the descendants of old proprietors who are now holding as tenants the land their ancestors formerly cultivated as their *sir* land, and of the cultivators who originally reclaimed the land. But I am doubtful how far such protection could be afforded without infringing on rights which we have hitherto recognized. Perhaps, in place of exempting the true *maurusi asamis* from enhancement during the whole term of settlement, it might be more expedient to allow them, in addition to the protection from enhancement for a term of ten years afforded by the existing rent law, the deduction of (say) 25 per cent from the amount to which the rent would be enhanced in the case of simple occupancy tenants. In other words, I would extend to their protection similar to that afforded by Act XVIII of 1873 to the ex-proprietary tenants of that Act.

19. The system under which enhancements are now applied for and carried out should be reformed. Landholders are allowed to give in applications in any year they please, provided that the application is preferred by the 31st December. They may apply this year to enhance the rents of A, B, C, D, and E, occupancy tenants in the village of Rampur. Next year they may apply to enhance the rents of F, G, H, also occupancy tenants, in the same village. Though enhancements can be made in individual cases only once in ten years, they are always going on.

20. It is easy enough to be wise after the event, and we must regret that, after the declaration of the revised assessments, landholders were not warned to bring enhancement applications within a year or six months, no such application being allowed for the 10 years next following. The suits could have been decided with ease and despatch by the settlement officer and his assistants on the rent rates which formed the basis of the assessment. It is true that there would be a fearful rush to the Rent Courts on the expiry of the prescribed term. There are difficulties in the way of simultaneous enhancements over large areas, but they might be overcome by means of more Rent Courts and a simpler procedure.¹

21. I must admit with Mr. Elliott that Mr. Buck's note on collection of land revenue does not leave on my mind a definite impression as to what he would wish to have done in the different circumstances that may arise (*viz.*, of “slight variations in the outturn” or of

¹ On further consideration of this subject I have recorded on my second note some additional remarks on it, and have arrived at the conclusion that the plan I have recommended in this

"violent oscillations," otherwise "catastrophic failures of crops"). I understand Mr. Buck to recommend that Government should assume the place at present occupied by the money-lender, and by granting suspensions charged with a moderate interest, when crops fail more or less, obviate the necessity of the cultivator applying for assistance to the grasping native money-lender. I doubt the feasibility of Mr. Buck's proposal. He frankly admits the difficulties in the way; among them the absence of that close acquaintance with agricultural circumstances on the part of the officers who collect our land-revenue which is necessary to working the system.

22. Undoubtedly the Government have a better guarantee for the payment of the suspended revenue *plus* interest than the money-lender has. But if it is true that the tenant is responsible together with the landlord to the Government, and the Government insist on the suspension of the rent (for which the cultivator is responsible to the landlord), can Government insist on the payment of the suspended revenue if the suspended rent is not paid?

23. Until Mr. Buck's proposal is set forth more clearly, it will be difficult to criticize it in detail. But I must record my recognition of the justice of his principle, "the chief feature in the reform proposed," that it is right that Government and the landlord should accept some portion of the responsibility occasioned by oscillation of produce. I would join, however, with Mr. Elliott in opposing the proposal to charge interest on suspended arrears, but I cannot accept his *improvement* on Mr. Buck's system. Mr. Elliott holds that it

would be both harsh and unwise in a season in which the whole crop fails, to exact the rent of the cultivators, and that Government should have the power of declaring that the rent should be suspended by the proprietors; that is, that Government should deny to the proprietors the assistance of its courts towards collecting rent by distraint or decree: but that, notwithstanding, the Government should not be bound to suspend the revenue, but should continue to collect it on the present system, not putting on any severe pressure, nor proceeding to the extreme steps of temporary abolition or transfer, but still should collect all that it can.

25. I cannot conceive a more unjust course. The poison, however, carries with it its own antidote, and the threatened proprietor, should the proposal become law, may smile at the threat. His landed property at any rate would be safe. The only process by which the Government could proceed, under Mr. Elliott's system, for the realization of arrears of revenue in years of drought would be by the service on him of a *dasah* (a written notice to pay), or by the sale of his movable property, or by the detention of his person in custody for a term not exceeding 15 days. Yet it would be rather hard on the proprietor to lose his movable property or to have his person detained in custody, say for a week only, because the Government prevent his collecting from his tenants the rents from which he pays his revenue; the theory on which our revenue system is based being that revenue is that portion of the rent *realized* by the proprietor which the State is entitled to claim.

13-12-78.

H. S. REID.

SECOND NOTE ON A MEMORANDUM SUBMITTED BY MR. ELLIOTT AND MR. BUCK TO THE FAMINE COMMISSION, SUGGESTING CERTAIN ALTERATIONS IN THE REVENUE SYSTEM IN THE NORTH-WESTERN PROVINCES, BY MR. H. S. REID.

1. My first note (of the 13th instant) was written before the memorandum was discussed between the president and members of the Famine Commission and the North-Western Provinces Board at Allahabad. I wish to add a few remarks on certain points raised in the course of that discussion.

2. Mr. Buck argued that no great loss would be occasioned to the landholder by withdrawing from him the power of enhancing his rents more than once during the currency of the settlement, as the enhancements would as a rule be small. This argument appears to me to cut both ways. If Mr. Buck's supposition regarding the small extent of the enhancement is correct, the tenant is no great loser by the present system.

3. It was objected that the settlement officer's soil rent-rates were average rates, and could not in many instances be applied in individual cases without injustice to either the landlord or the tenant. It is true that the settlement officer's soil rent-rates are standard (or guide) rates only, and that they may be either high or too low in particular instances. But this fact furnishes no reasonable argument against the assessment of rent enhancement cases by the settlement officer. No other officer could tell so well how far he should in each individual case go on, or above, or below his standard rate. It would be open to the landlord to show that the land with which the officer had to deal was of better quality than the average of the soil of that description, while the tenant would be equally at liberty to show that it was below the average quality, and that, consequently, the rent should be assessed at a rate above or below the standard soil rent-rate. How far it would be advisable to allow Rent Courts to enhance rents on settlement officers' soil-rates is a different question entirely. After the settlement has run for a time, the standard of rent-rates may have arisen; and, moreover, the Rent Court would not be able to form as reliable a judgment regarding the quality of the soil as the officer who made the settlement.

4. But the adoption of the proposal to restrict the landlord's power to enhance to stated periods occurring at considerable intervals, might in practice prove most injurious to the class it is intended to protect. When you tell the landlord that if he does not apply to enhance rent within six or twelve months after the declaration of the revised assessment he will not be allowed to do so for ten years, you fairly compel him to enhance the rent on tenants he would otherwise leave alone, at any rate for a time. The injury to the tenant would not be so great if the settlement officer based his

assessment of the land revenue on the rent-rates prevailing in the particular estate, and enhanced rents on those rates. Settlement officer's rent-rates, which must be approved by the Board of Revenue before they are applied for assessment purposes, are not excessive; but though they are rates up to which the landlord can enhance without rack-renting, they are, as a rule, a good deal higher than the rates at which the existing rents are paid in particular villages. If it were not so, we should not so often find the assumed rental on which the revenue is based greater than the actual rental; that is, the declared rental corrected for *sir* and rent-free land. *E.g.*, the occupancy-tenants in a particular estate are paying a rental of Rs. 400 at the rate of Rs. 4 per acre for good loan land, the average *jumana* rate for soil of the same kind and quality being Rs. 6 per acre. On this latter rate the settlement officer calculates the rental, which comes thus to Rs. 600, of which he takes a moiety as the Government share. If you tell the landlord that, if he does not enhance his tenant's rents within six or twelve months after the revised assessment is declared, he cannot do so for another ten years, you virtually suggest to him to raise his rental at once by 50 per cent. Of course the same will be the result whether the rent is enhanced by a Settlement or by a Rent Court. Thus I believe to be the most formidable objection to compulsory simultaneous enhancement (so to call it).

5. Again there are great and serious difficulties in the way of simultaneous enhancement over large tracts. The Rent Courts would be fairly flooded with applications from the landholders; we ourselves should be driving into court under the rule that no rents could be enhanced in that tract for another ten years. The aggravation and soreness caused by enhancement proceedings would be, so to speak, concentrated and intensified, and the result would be far more calamitous than any which can follow from the "dropping fire" of enhancement cases under the present system. These considerations compel me to modify very materially the views expressed in para 21 of my first note. I would recommend no measure which would have the effect of driving landholders to enhance; but I would have a simpler procedure, and while selecting the very best of our junior officers for our Rent Courts, be content with their arriving in cases, in which the parties cannot agree, at a fairly equitable decision, without insisting on mathematical precision. Of course the number of the Rent Courts must be increased if the present number cannot keep down the work.

6. In my former Note I objected to the proposed charge of interest on suspended arrears of rent and of revenue. I prefer the provisions of section 23 of the Rent Act, under which interest is not charged. Rent is suspended (and remission of revenue is a necessary consequence of suspension of rent) where there is a failure of the assets from which the rent is paid. Three parties share the produce of the land, as Mr. Buck rightly insists, *viz*, (1) the Government, (2) the landlord, and (3) the tenant. The produce in a year of drought, say, is *nil*. There is nothing for the parties to share. Hitherto the loss has fallen on the third, and to some extent on the second party also, while the first has insisted on getting its share of the produce the land *ought* to have yielded, on the principle that it has settled with the second party for a term of years, and that bad years must be taken with good. It is now proposed not that the Government should forego, but only suspend payment of the share by party No. 2, who again eventually realizes his share of the produce in the form of rent, out of which he has to pay the Government share, from party No. 3. In the long run neither Government nor the landlord lose anything, for they eventually get the rent, or the revenue *with interest*. The only loser is the tenant, who has to pay from the assets of a future period for the year in which the produce failed, not only his rent for that year, but *interest* on that rent as well. Surely both the landlord and the Government should forego the interest, as is done in cases under section 23, Act XVIII. of 1873. I do not contend that interest should be taken in no cases whatever. There may be cases in which interest may fairly be demanded, but they will be the exception and not the rule. As a rule interest should not be demanded even at the risk of impairing the symmetry of the idea that Government is to be the tenant's banker. I am afraid that if suspensions are made more general than they are now, the necessity of granting timely remissions may be lost sight of. Suspension of rent or of revenue is no kindness in the case of impoverished tenants and landlords in a country which, like Bundelkhand, is not protected by irrigation. In such cases remissions *must* be made.

7. The suspension theory is based partly on what I hold to be a very mistaken idea, *viz.*, that our assessments of revenue are fixed at one-half of "the *average net assets*." As a rule, the revenue has been assessed at half of a full rental,—a rental that can be realized by landlords only in good years, and practically it must be so. It is simply impossible for the Settlement Officer to predicate what the average net assets would be during the coming term of 30 years. He must assess on the present rental. To quote the rules prescribed by Government for the guidance of the Settlement Officers,—“The revenue assessed on each mahál (estate) shall ordinarily be 50 per cent of the *estimated assets* of the mahál. * * The *estimated assets* are the assets which the Settlement Officer

“estimates that the mahál will or can produce after the *corrected rental has been raised by enhancement suits to its full amount*, including also all other receipts which are or can be derived from the natural products of the mahál, or from cesses sanctioned by Government under section 66, not being non-agricultural cesses of an exceptional kind, such as dues on traders at a fair or pilgrims to a sacred place.” In a good year succeeding a bad one it is all the tenant can do to pay the rent of the good year. The suspended demand hangs like a millstone on the person for whose benefit the suspension is made. It is, however, often the case that an indifferent kharif is followed by a larger rabi outturn than usual. In such a case suspension of rent and revenue may afford adequate relief.

8. Even if our assessments were calculated on average net assets, it would be impossible to carry out strictly into practice the theory that good and bad years are to be taken together until the landholders have learnt habits of thrift and economy. The surplus profits of a good year as a fact are *not* put by to provide means for paying the revenue of a bad year. In districts like Banda, and Hamirpur, and Jhānsi, which are not unprotected from drought by irrigation, and the zamindars are notoriously unthrifty, it would not be possible to exact the payment of the whole revenue of years in which there was a deficient rain-fall, even were grace allowed, without running the zamindars. The Government must be prepared to remit as well as to suspend rent.

9. In the 18th paragraph of my first Note I have stated that my remarks, regarding the withdrawal of the landholder's right to enhance the rents of his occupancy-tenants, refer to those tenants who have been vested with right of occupancy under Acts X. of 1859 and XVIII. of 1873. My views on this subject were recorded in a Note of the 9th July, 1872,¹ to be found in the proceedings of the Lieutenant-Governor, North-Western Provinces for July, 1873, pages 14 *et seq*. In that Note I recorded my reasons for advocating the fixation at settlement of the rent of certain classes of privileged tenants for the whole term of settlement, and for excluding from this privilege tenants on whom the right of occupancy was conferred under the “twelve years' rule” of Act X. of 1859. A copy of the Note will be laid before the Commission. I will here only point out that the present law treats all occupancy-tenants, other than tenants at fixed rates, alike in regard to liability to enhancement; and the rents of privileged tenants, who before the passing of Act X. of 1859 were protected from enhancement by the custom of the country, and in many instances by an express stipulation in the village administration paper, are liable to enhancement equally with those who had no right before Act X. of 1859 became law.

30th December, 1878

H. S. RMP.

NOTE ON MR. C. A. ELLIOTT'S PROPOSALS FOR REVISION OF THE RENT AND REVENUE ACTS OF THE NORTH-WESTERN PROVINCES, BY MR. C. P. CARMICHAEL.

Mr. Elliott's proposals are three in number, and I will take them up in the order in which he states them.

The first proposal is that “Any enhancement decreed by a Rent Court on the rent paid by an occupancy-tenant shall run till the close of the period of settlement, and shall not be liable to disturbance within that period, except on two grounds,” which he specifies.

Before discussing this proposal, it may be well first to ask ourselves the question—“What is the occupancy-tenant of the present day?” The answer is, he is a creation of our own. To prove this I have only to refer to Sir William Muir's Minute of the 29th May, 1863,¹ which I have had printed *in extenso* and filed with these papers. Sir William Muir shows (paragraphs 10 to 28) what the hereditary tenant of former days was, and then (paras. 29 to 41) how the occupancy-tenant of our times was created by our legislation under Act X. of 1859. He admits (para. 9 of his Minute) that he is in a degree responsible for the legislation which brought about this new creation, but he considers that it was a mistake; that he did not rightly foresee at the time what the consequences of such legislation would be; and in paragraph 42 to close of

his Minute he details the remedial measures which he would apply to correct the mistake which he considered had been committed, *viz*, he would make *succession* the test, and not, as we have done, allow a permissive right of occupancy to merge into a prescriptive title. He would, with Mr. Lushington, one of the ablest Judges of our former Sadr Court (whose opinion he quotes in para. 33 of his Note²), allow the landholder the power to create hereditary tenures; but he is decidedly against the growth of a prescriptive title from 12 years, occupancy, as being opposed to the custom of the country, and as such therefore opposed to the true principles of legislation on matters connected with the soil—which legislation should, he argues, be based, not on economical theories, which are dangerous things, but on the habits and axioms of the people, on the existing status of rights, and on the popular feeling and conviction of their growth. I can add nothing to what Sir William has here written on this subject, and on the difference between the hereditary tenant of former days and the occupancy-tenant of our own times, unless it be to state that the word “maursi,” which is now

¹ Enclosure B. pages 1-8

² Enclosure A pages 9-13.

applied indifferently in many places to both classes of men, but which was applied formerly only to the strictly hereditary man, means "hereditary," and shows, therefore, most unmistakably what the Native feeling was on the subject. Indeed, until Act X. of 1859 was passed, no one ever heard of a tenant "bà-hak mukà-bizat," as the new occupancy man is called. All this supports Sir William's contention that succession by inheritance, and not permissive occupancy growing into a prescriptive title, should be the real test for the recognition of such a tenure. The hereditary tenant of former days was indeed a man whom the landlord never refused to recognize. He was sometimes the descendant of some off-shoot from the proprietary body, whom, by reason of this clanship, they allowed to cultivate at favourable rates; oftener he was the descendant of some old stock, who had assisted the forefathers of the zamindars in locating the village and in bringing the lands under cultivation, and as such a man whom they delighted to honour. On the revision of a record of rights, the whole proprietary body readily allowed men of this class to be recorded as holding at favourable rates for the currency of the settlement. And such men are still, in a measure protected by our present Rent Act, section 20 of which enacts that "whenever it is found by local custom or practice that any class of persons, by reason of having been formerly proprietors of the soil or otherwise, hold at favourable rates of rent, the rate shall be determined in accordance with such practice."

But the "modern mautási," by which title Sir William Muir aptly describes the occupancy tenant of our own times, has really no right to any consideration at the hands of his landlord. He is to all intents and purposes a parvenu—an upstart—a creation of our own, brought into existence by the negligence of the zamindars in allowing in their ignorance a permissive right of occupancy to emerge into a prescriptive title. If we were to refer to the old Records of Rights under Regulation IX. of 1833, and compare the number of tenants there recorded as *mautási* or hereditary, with the number of tenants recorded under the same title in the records of our last settlements, we should, I think, be appalled at the injustice we had done the landholders in planting this body of middlemen, who have no right or proprietary title in the soil whatever, to intercept what are really the zamindar's profits from the estate. It is the fashionable cry now-a-days that the zamindars are not an improving lot of men; but I should like to see the English landlord who would attempt to improve his estate when two-thirds of his tenantry were men of this class, who could set his authority at naught, who intercept his profits, and who cannot be evicted from their holdings so long as they pay a rent which is adjusted by a standard amongst themselves? For, in our extreme tenderness for these men, and regardless of the unfortunate zamindars, we have enacted that "the rates of rent paid by occupancy-tenants shall be the rates paid by tenants of the same class for land of similar quality with similar advantages!" We have therefore banded them together against their landlord—we have given them the power to foil him at every turn—and then we turn round on the landlord and say "you are not an improving man!" And, then, to culminate as it were our acts of injustice towards him, and to remove him, as it were, from off the very face of the earth, it is proposed to give these said occupancy men, whose rents can even now only be raised once in a decade up to their own standard, a fixity of tenure for the currency of the settlement, making them therefore co-equal with the zamindars as regards privileges, but without any of the responsibilities which attach to the proprietor of the soil. If we could, without injustice to the present proprietors of the soil, convert by any process this vast number of occupancy-tenants into small landed proprietors, then indeed they would be a tower of strength towards our Government. But, as this is impossible, the proposed scheme, as curtailing still more the rights of existing proprietors, in no way commends itself to me. Indeed, the more I think over it the more am I against it. It would, I consider, be little short of an act of insanity, and we should reap the fruits of our folly in the complete alienation from us of our landed proprietors. Of course all schemes are more or less practicable, but I trust that I have shown sufficiently both the injustice and the impolicy of the one here proposed.

There remain, however, for consideration two other questions arising out of this first proposal of Mr. Elliott. The first is, "Can the present procedure—"

"of rent of these tenants once in a decade in any way be simplified?"

The second, "Will it be better to adopt the two exceptional cases given by Mr. Elliott for those now in 'force or not?'"

As regards the first question Mr. Elliott, it will be seen, affirms that the present procedure *cannot* be simplified. But I think that it can, and in the manner laid down in para. 10 to 17 of Sir William Muir's second Note of the 11th August 1863, which will also be found amongst the printed papers attached.¹ And I cannot understand why the framers of our present law when they ruled that the rates of rent of an ex-proprietary tenant, whose status, rights, and privileges they declare in the same breath (section 7 of the Act) to be *exactly the same as those of an occupancy man* should always, when first fixed, or when subsequently enhanced on, be in the ratio of 25 per cent. below the rate of tenants-at-will, *i.e.*, the rack-rent of the day, did not rule also that the occupancy-tenants' rates should be adjusted in the same manner, or if they thought that 25 per cent. was conceding too much to this class, allowed them a deduction of 20 per cent. only? Whatever percentage be allowed on the score of any rights, real or assumed, I think that no one will presume to question the maximum that the rack-rent of the day is the one perfect standard by which all other rents should be adjusted.

The question then arises out of this admission "should such adjustment take place at certain stated decades for the whole body of tenants, or at the will of the zamindar, as each tenant's decade falls in, as in the 'case now?'" I am in favour of the maintenance of our present plan for the following reasons:—

(1.) It has worked well. There have been but 14,000 enhancement cases in all for the last five years, a number by no means large, if regard be had to the number of our district courts, and still less if regard be had to the immense number of occupancy tenants.

(2.) It is far better to let rents adjust themselves thus gradually than to have a sudden rise at a stated time, a rise which would be felt much more by the tenant, while it would be hard on the landlord, where the tenant's tenth year fell in before the time fixed by Government, that he should not profit by it.

(3.) We should require extra courts and officers for the immense amount of litigation which would be thrown on us at one stated time, if such were fixed; and there might, and probably would be delay in the decision of many cases, which delay would be unjust to the landlord.

In effect, moreover, if the matter be considered carefully, a zamindar can seldom, under the present law, have more than two shots for enhancement at his occupancy-tenant during the whole currency of a settlement. I would not, therefore, disturb the existing state of things here; but I would simplify the procedure in the manner I have above advocated, and which must, I feel sure, commend itself to everyone.

Now, as regards the second point, the two changes which Mr. Elliott would substitute as reasons for intermediate enhancements. The first of these I will not touch on, as my colleague has written on it at great length, and the second it is hardly necessary to refer to, as the law would, of course, give redress at any time to a landlord when a tenant broke up waste land, or cultivated another man's fields without his (the landlord's) permission. Our present Rent Act is certainly silent on these points, but probably because it was thought superfluous to notice them. It does, however, give to my mind two excellent cases in which enhancement or abatement can be made at an intermediate period. The first of these is, that where land has been gained to a tenant's original holding by alluvion or accretion from a stream, the landlord can demand rent on the same. It is but right that he should have this power, as if the assessable area of his village is increased beyond a fixed percentage by this cause, the Government demands an increased revenue from him. Per contra, the tenant can claim abatement for land lost by diluvion. The second case is "where the productive powers of land have increased otherwise than by the agency or at the expense of the tenant, the landlord can claim enhancement; and similarly, per contra, where such productive powers have decreased from causes beyond the tenant's control, the latter can claim abatement. I can see nothing unfair in either of these two provisions. They are fair both for landlord and tenant. Although the Government has *goaded* the landholder, in the last case

waived for the currency of the settlement, its right to any enhanced revenue for increased productiveness, it at the same time makes the zamindar no allowance for the reverse, should such occur. On the other hand, the provisions of the Rent Act are so framed that the interests of landlords and tenants are made identical. They share and share alike in adversity or prosperity, in weal or in woe. I see therefore nothing to be gained, but much to be deprecated in doing away with these two provisos, and for substituting in their place the two exceptional cases put by Mr. Elliott.

I come now to the consideration of Mr. Elliott's second proposal, which is to convert tenants-at-will into occupancy-tenants. This is not the first time that this proposal has been broached. I would refer to what Mr. Lushington, one of our old Sadr Court judges, wrote on the subject. His remarks will be found quoted *in extenso* in para 33 of Sir William Muir's Minute of the 29th May, 1863, before referred to. He writes that he had thought a good deal on the subject, but had come to the conclusion that there was no object in the measure, as also that it was next to impossible to declare the process by which it could be carried out. I confess that I feel it an honour to have so eminent an authority to support me; for I have always been taught that fixity of tenure and rent by valuation, instead of by contract, are simple nonsense, and incapable of reduction to any form that shall give effect to the ideas. Besides which, Mr. Lushington, I consider, argues rightly when he says that, so far from increasing the number of tenures of this kind, it is better for the country that they should fall in, since the rights of sub-tenants always interfere with the successful and profitable management of land by the proprietor. Again, what, I ask, is the position of a tenant-at-will? He is a man who cultivates one year one piece of land, another year another piece, at the will of his landlord. Is this man to be allowed, without the full consent of that landlord, to purchase the hereditary title in any land he chooses to select on terms to be fixed by the legislature? There are such things as vested rights, and, to the native of this country, that in land is the most precious of all. We have in our ignorance often, and in our arrogance and self-conceit not a few times, committed unwittingly many acts of injustice towards the people of this country; but I doubt much if the legislature could be found which would sanction such a wholesale act of confiscation as that here contemplated by Mr. Elliott. However, there is no act of injustice which has not its remedy, and were I a landholder, I would, in anticipation of this coming storm, which was to sweep away all my most cherished rights, convert at once into sir, that is, cultivate myself, by hired labour, every acre of land which I had hitherto leased out annually to tenants-at-will. Mr. Buck, indeed, does not mince matters, but says plainly in the margin of Mr. Elliott's note, that he would like to see a ryotwari settlement in the North-Western Provinces. We might, with equal justice, ask for the introduction of a zamindari settlement into the Madras Presidency. I can only

express my astonishment that two officers so intimately acquainted with the system of our land tenures in these Provinces should have brought forward a proposal of this kind, the very attempt to carry out which would, I have no hesitation in affirming, tend to revolutionize the country, and to set the whole body of landed proprietors against us, as also to intensify still further those feelings of bitterness between landlord and tenants which the proposers so much deprecate.

In connection with the proposal there is another point of no little importance which must not be overlooked. The rents paid by tenants-at-will are virtually the rack-rents of the country; they are the indicia by which we are guided in ascertaining the real letting prices of land, and as a sequence in determining what should be the real assets of an estate, on which assets, so estimated, we base our demand for the Government revenue. The area of our inquiry in this direction is already much circumscribed by the great number of privileged tenants of various kinds holding at favourable rates of rent, much below the proper rack-rent of the day, and yet it is proposed to narrow this area still more, if not to do away with it altogether, by removing into another class the tenants on the rents of whose holdings we rely for our data of assessment.

It remains but to say a few words on Mr. Elliott's third and last proposal, which is to collect in bad seasons the revenue from the zamindars, but not to allow them to collect rent from their tenants, refusing them, for this purpose, the assistance of our courts. I can hardly conceive a greater act of injustice. Revenue, as naively but truly stated by my colleague, is that portion of the rent realized from the tenant which the State is entitled to claim, and yet we are to deny the zamindars the means by which they are to attain the end? I think, however that we might, in exceptionally bad years, limit the demand of the zamindars on their tenants to the extent of the revenue, plus ten or fifteen per cent. for the expenses of collection. More than this I do not see that we can do; and even this might press hard on the zamindar for the time, but I would allow him to collect his arrears of rent hereafter. As regards what Mr. Elliott calls slight variations in the outturn, I hold with him that these are not matters for our interference, our settlements being based, as I have always understood, on the assumption that half of the net average assets to the zamindar constitutes the revenue. If, however, as I gather from my colleague's remarks (and the Settlement department is in his hands) this is not the case, and the assessments are pitched so high that the people can only make good the demand in really good years, then, it appears to me that the proper remedy is to revise these assessments, and to lower them to a scale on which we can rely for good and bad years indifferently; in fact, for everything but a series of "catastrophic failures."

C. P. CARMICHAEL,
Offg. Jr. Member.

Allahabad: 15-1-'79.

X.—AGRICULTURAL INDEBTEDNESS.

THE DECCAN RYOT.—BY MR. H. S. CUNNINGHAM.

[The documents referred to in this Note are—

1. Report of the Committee, 1875 - - - - R.
2. Abstract of Proceedings in the Legislative Council 17th and 18th July 1879 - - - - L. C. and Bill then introduced.
3. Letter of Government of India (Legislative Department) to Bombay Government, 26th July 1879.
4. Letter of Bombay Government to Government of India (Agriculture), 6th April 1877.
5. Minute by His Excellency the Governor of Bombay, 29th October 1878.
6. Evidence given before the Commission E.]

DESPITE the weight of evidence in favour of great occasional indebtedness, there is, it appears to me, considerable ground for believing that the exceptional misery of the Deccan ryot, as a class, has been unduly emphasized, owing to the outbreak, the Commission, sensational articles in England, and, as the Famine Commission had an opportunity of observing at Poona, the vehement advocacy and agitation of a very active Native society which has its head-quarters at that place. The facts set forth in Sir R. Temple's Minute on Sir L. Mallet's letter seem to prove, beyond the possibility of dispute, that the community, as a community, is not declining under British rule; that its assessments are light; that indebtedness has decreased; and, that though its prosperity is not marked or so unchequered as in other parts, more favoured as to climate, &c., yet that, on the whole, "the condition of the Deccan peasantry is improving, and goes on prospering and to prosper in a rude but substantial way."

2. On the other hand, it impossible to doubt that there prevails in certain classes poverty of an acute and hopeless kind, so general and so serious as to justify State interference, if that interference can take place without disturbing and injuring the prosperous portion of the community. The question seems rather whether the remedial action, now about to be adopted in the four districts, or some modification of it, ought not to be applied more frequently and more promptly, wherever the Government becomes aware that considerable classes of its subjects have sunk into chronic indebtedness, and are in urgent need of extrication from their difficulties.

3. Some of the remedies proposed might, probably, be adopted with good results, not only in distressed districts, but in every part of the country alike.

The Commission might, for instance, enforce, as generally applicable, one of the principles affirmed in Mr. Hope's Bill, *viz.*, that one way in which the agricultural classes may be helped, is by giving them a cheaper, simpler, and more suitable class of tribunal for petty civil suits than is provided under the existing law. The general course of things of late years appears to have resulted in increasing the burthen on the poorer agricultural classes as regards stamps, litigation, &c.

4. Considering² that of the 1,400,000 suits annually

¹ Experiments show that the revised assessment does not exceed 12 per cent., is often only 6 per cent., and on inferior lands is under 4 per cent., of the value of the gross produce.

Sir R. T's Minute, § 54.

² Mr. Hope's speech, p. 26.

In 1877 there were, out of 1½ million of suits—

	Rs.
580,000 for sums between 20 to	100
453,000 " " 5 to	20
179,000 " " 5 and under.	
175,000 " " 100 to	500
19,000 " " 500 to	1,000
11,000 " " 500 to	10,000
780 " " 10,000 to 1 lakh	
61 " " above 1 lakh.	

The great mass of litigation accordingly was for sums under £10, the largest portion being for sums under £2, and 179,000 for sums under 10s.

The Commission was informed that of the suits filed in 1876 in Bombay, 91 per cent. were for amounts below Rs. 500, and of suits disposed of in 1876, 8,000 under Rs. 10, 43,800 under Rs. 10-20, and 96,000 under Rs. 20-100.

See Wasudeo Joshi's evidence.

disposed of by the courts of British India, 1,200,000, or 85 per cent., are for sums under Rs. 100, and 630,000, or 44 per cent., for sums under Rs. 20, a strong *prima facie* case appears to be made out for tribunals which shall dispose quickly, easily, and cheaply, and by a procedure suitable to the wants of a humble order of litigants, of a vast mass of petty litigation. But this does not appear to have been at all the result of the changes made during the last generation: these changes, if they have not produced, have certainly been accompanied, by a large increase in litigation; while, at the same time, law proceedings have become more costly and prolonged¹. In 1877, Mr. Hope observes, the average duration of an uncontested suit in the Bombay Presidency was 132 days, and of a contested suit 272. We were informed also that the cost of an undefended suit, for, say, Rs. 20, is double what it was in 1827, the charge in the one case being Rs. 2-12-1, and the other Rs. 4-13-1. There appears to be some ground for supposing that litigation received an unfortunate impulse in 1860 by the passing of the Civil Procedure Code and the Limitation Act of 1859². In 1860 the suits numbered 91,245; then these Acts came into force; the number of suits rose at once to 312,000, and have since remained at an average figure, nearly double that of 1860, *e. g.*, in 1876, 177,000.

5. Now, if the course of these suits be considered, it is obvious that the greater part of the burthen falls on the defendants³. In 1876 the undefended suits ranged from 60-74 per cent. of the whole number in the four districts, and in 1877 from 57-66 per cent. In those cases the stamp, service fee, pleaders' fees, &c., are all included in the decree, and realized in execution. Mr. Wasudeo Joshi also informed the Commission the stamp revenue of the whole empire had increased from 45½ lakhs, say 455,000*l.*, in 1800 to 284 lakhs, say 2,840,000*l.*, in 1877,⁴ an increase which no doubt mainly falls on the indebted people, who have to execute mortgages, &c.

6. Taking the whole Mofussil legislation⁵ it is believed that Government makes in the Bombay Presidency an annual profit of more than 4½ lakhs,⁶ the

High Court appellate side and Mofussil	
Courts having an income of	Rs. 23,34,000
And costing only - - - -	" 17,74,000
Balance - - - -	" 4,60,000 ⁷

This 46,000*l.* is no doubt contributed to the Treasury by the most necessitous class in the country, and tends to sink them lower than ever.

7. Another most unfortunate change in the law is the increase of the stamp duty on awards. By the old law (Regulation 7 of 1827), no stamp duty was levied on an award, and no court-fee for filing it. By the Stamp Act of 1879, a stamp is imposed on awards, equal in the case of amounts not exceeding Rs. 1,000 to the stamp on a bond, in other cases to Rs. 5. Thus an award as to Rs. 500 has to bear a stamp of Rs. 2½; and whereas under the old law a petition to file an award bore a stamp of only eight annas, by the new Court Fees Bill such an application must be made on a stamp equivalent to half the amount of the court-fee payable on a "plaint for the amount," or, if the sum exceeds Rs. 500, on a stamp of Rs. 20. The consequence will be that, whereas an arbitration award and its filing in Court used to cost eight annas, it will hereafter cost Rs. 16-12-0 for the court-fee, and Rs. 2-8-0 for the stamp, an amount quite large enough to favour a serious obstacle to arbitration. It would be well to add to Mr. Hope's Bill a provision removing all taxation of proceedings in arbitration; they are about the last thing out of which the Government ought to try to make revenue.

8. The multiplication of tribunals will also no doubt

¹ P. 26.

² Wasudeo Joshi's evidence.

³ Mr. Hope, p. 24.

⁴ Estimate for 1878-79, 3,071,000*l.*

⁵ Deccan Report.

⁶ Appen. A., p. 292.

⁷ These figures are for 1873.

be a great concession. Mr. Hope mentions that out of 4,650 villages in the four districts¹ with which the Bill is concerned, only 29 per cent. are within ten miles of their courts, 35 per cent. are from 10 to 20 miles, 24 per cent. from 20 to 30, and 12 per cent. between 30 and 60.

9. I do not know whether the objection taken by the legal member to section 20 of the Bill is meant seriously. That section provides that when a decree for less than Rs 50 has been recovered from an agriculturist, the Court—if satisfied that the debtor is unable to pay the whole, and that there is no other claim against him—may direct payment of such part as he can pay, and give him a discharge from the rest. This is objected to as unconstitutional, on the ground that it “disturbs absolute vested interests.” But every new insolvency law does this, and for an example one need not look further than the last amendment of the Code of Civil Procedure, which empowers the Court, under certain circumstances, to declare a debtor absolved from two-thirds of the decree. This provision will apply to decrees obtained in suits commenced before the Act came into force, and is obviously a far more serious “interference with absolute vested interests” than anything in Mr. Hope’s Bill. The point, however, is absolutely unsustainable, and is not worth serious discussion.² The defect of the Bill, as it seems to me, is that Chapter IV. as to Insolvency, does not go half far enough.

10 The fact with which Government has, here and elsewhere, to deal is a general insolvency affecting large classes of people who are, under one name or another, tenants of Government, and in whose substantial prosperity Government has, therefore, a direct interest. These tenants, having a sort of marketable tenant-right conferred on them by the settlement have, in many instances, used their improved credit with such improvidence and negligence that it is perfectly out of the question for them ever to be again really solvent; in many cases they are the mere slaves of the creditor, who does not at all want to become land-owner, but whose legitimate business is to get all he can out of his debtor.

13 According to this view Government ought to assert its right—wherever it is assured that a material fraction of the population is hopelessly indebted—to come in, and, with the superior authority of the paramount power, to put an end to a state of things whose continuance is an administrative loss, and may become a political danger. This it should do by applying to the tract in question a special machinery and treating it in fact as a morbid portion of the community calling for exceptional treatment. The objects in view would be to produce as little shock to trade, hardship to creditors, and general disturbance as possible; to avoid, as far as may be, any shock to credit,—such must be occasioned by any sort of jubilee year or general white-washing of debtors; and while rescuing the agricultural class from ruin, to place it in a position in which it will not have the opportunity of again plunging into indebtedness.

18. But in order to accomplish this, special means would be necessary; these people would, presumably, be the least diligent, skilful, and provident of any, and they would require help and watching. The revenue must be collected in such a way as to dispense with the agency of the money-lender—that is, it must be taken at a time and in a manner which will ensure the capacity of the person to pay, viz., in proportion to the realized crop. While adhering, therefore, to the

principle of a fixed assessment, I would apportion its incidence according to the season and crop. Assuming the assessment to be Rs. 50, and ten years to be a sufficiently long period to give a fair average of seasons, the object would be so to apportion the payments as that in ten years the sum of Rs. 500 would have been paid, nothing being exacted when the crops failed, a portion only when there was a moderate harvest, and as much as possible when there was a bumper crop.

19. There appears to be no doubt that as a general rule the assessments in the Deccan are extremely moderate. Sir R. Temple says¹ that the rate is seven annas (10½d.) to 12 annas (1s. 6d.) on the culturable acre; the range is from 4 annas up to Rs. 1-4, Rs. 2 and even, near cities, Rs. 3 per acre, and that these rates represent on fair soils not more than ⅓rd of the average gross produce at present average prices, and much less on inferior lands; and one proof of the moderation is that ¼th of the Government holdings are sub-let, the tenant getting a living and the landlord his rent, besides the Government revenue.² and His Excellency considers that a further diminution of the assessment would not improve the condition of the ryots.³ The object, therefore, should be to get in this moderate revenue with exactitude, and for this end I would charge interest on all sums paid in arrear of the time at which they were due, and give interest on all sums paid in advance of the time at which they are due. Supposing, therefore, Rs. 50 per annum to be the normal rate (or, say rather, as the instalment should be carefully adjusted to the crop, Rs. 25 per crop), supposing there to come a bumper crop, Government would declare two or more instalments to be leviable, and that if the ryot thereby became in advance of his annual rate, he would receive interest at 6 per cent. on the amount by which he was in advance. Supposing, on the other hand, that there was a failure, a corresponding claim for interest would be made in respect of all sums by which the ryot was in arrear of his annual payments.

20 The advantages of this system are (1st) that it is strictly just, the Government assessment being presumably a moderate one, and Government being entitled to get it, (2nd) that it reproduces on a safe scale instead of a ruinous one, the process which now goes, inasmuch as, instead of borrowing at high rates from the money-lender, the ryot would borrow from Government on low rates, (3rd) that, with low and improvident classes, it would be the best possible commencement of a training in habits of forethought and saving, by introducing a form of compulsory savings banks. The people learn nothing by the existing system; but are simply ruined.

21. All this would, no doubt, require a great deal of supervision and involve much inconvenience; but it must be regarded as the abnormal treatment of the infirm members of the State, and in the light of a remedial measure.

22. It would be distinctly understood that the tenant had no interest in the land to pledge, and his credit would accordingly be much impaired. This must be met by Government doing a good deal in the way of advances for land improvement, sinking wells, aiding in the purchase of bullocks in times of calamity, and generally being more ready to assist than it is in the case of the ordinary population.

23. I would try the experiment only in the desperate places, where clearly something must be done, and be guided by its success as the future course to be pursued; but power should be taken to extend the fluctuating-payment system to whatever part of the country or class that Government thought fit.

24. Annexed is a rough draft of a Bill which may serve to explain the proposed arrangement.

¹ Poona, Ahmednuggur, Satara, and Sholapur, aggregating 24,000 square miles and 3½ millions population.

² When the Austrian Government commuted the feudal rights of the great land-owners, it cancelled one third of the valuation estimate, and provided only for the remaining two thirds on the terms which it considered proper. See Report by Mr. Lytton, 15th January 1870.

¹ Sir R. Temple’s Minute, § 37 and 38.

² § 34.

³ § 56.

ROUGH DRAFT OF A BILL FOR THE RELIEF OF INDEBTED AGRICULTURISTS.

1. This Bill may be called "The Indebted Agriculturists Bill, 1879:"

It shall come into force on _____; and shall apply to—

- (1.) any district,
- (2.) portion of a district, or
- (3.) class of agriculturists,

to which the Local Government, with the previous consent of the Government of India, by notification, &c., declares it to be applicable.

The Government may at any time exempt any individual family, class, or local area from the operation of the Act.

2. Within three months from the date of any such notification the Local Government shall give notice that all claims against agriculturists, to whom the Act has been declared applicable, must be filed by a certain date in a form to be prescribed, and that any claim not so filed will be considered to be extinguished.

3. For the examination of the claims so filed the Local Government may appoint such officers as it thinks fit; and the officers so appointed shall draw up a statement of each claim specifying principal, interest, and general circumstances. Such officers shall have powers of a Civil Court to call for documents, examine witnesses, &c.

4. The Local Government shall appoint such officers as it thinks fit, of the rank of Collector or District Judge, to adjudicate upon the claims so reported.

5. If, upon a consideration of the circumstances of the debt, it appears to be equitably due, and if the position of the agriculturist is such that there is a likelihood of his repaying it or such portion of it as the officer considers to be equitably due and to be reasonable under the circumstances of the case, the officer may direct it or such portion of it to be repaid in such instalments as he thinks fit, and, when the whole is not ordered to be repaid, shall give the agriculturist a discharge from the balance.

6. If there seems no likelihood of the agriculturist paying off the debt or such portion of it as the officer fixes under the last preceding section, the officer shall declare the agriculturist to be insolvent, and shall adjudicate on the sum which the creditor is to receive.

In such adjudication the following principles are to be observed:—

(1.) If the creditor has received the entire principal of his debt, the debt will be considered as discharged;

(2.) where the creditor has not received the entire debt the officer will consider—

- (i.) its circumstances as to equity, oppression, &c.,
- (ii.) the possibility of the debtor ever discharging it, i.e., what proportion there is a reasonable chance of the creditor ever getting, and the delay, &c., involved,

and, upon a combination of these considerations, shall decree what amount is to be paid to the creditor. As a rule, if the creditor of an insolvent debtor receives 25 per cent. of his principal, this must be regarded as an equitable settlement.

6a. The portion so adjudicated shall be forthwith paid to the creditor from the Public Treasury.

7. All the portion of the debt not so paid will be considered to have been transferred to Government; and the said officer will decide, in each case, what payment is to be made to Government in respect of it, the object being, if possible, to secure a series of payments which it will be within the power of the debtor to make, and which will, in a course of ten to fifteen years, extinguish principal and interest at 4½ per cent. of the sum paid by Government to the creditor.

8. This sum will then be added to the yearly instalments due by the insolvent in respect of land-revenue. The insolvent will then be replaced in possession of his holding, discharged from all debt except the instalments which he is bound to pay to Government along with his land-revenue. These instalments will fluctuate in accordance with the land-revenue fluctuations as hereafter described.

9. An insolvent so replaced will be unable to alienate or charge the land which he holds.

10. In any future proceedings against such an insolvent, the following shall be exempted from attachment:—

- (1.) lands and wells;
- (2.) dwelling-houses;
- (3.) implements, materials, and animals used in husbandry;
- (4.) household implements;
- (5.) implements of trade;
- (6.) wearing apparel, except jewels;
- (7.) agricultural produce which the Court is satisfied is intended to be used, and is required for food for the debtor's family or fodder for his cattle.

Fluctuating Revenue.

11. The total land-revenue due in respect of a holding for a period of ten years shall be thrown into a lump sum. Such sum shall be considered as ordinarily payable in twenty half-yearly instalments; and the chief Revenue authority of the Province may, with the previous consent of the Local Government, from time to time declare, with reference to the crops and seasons in any locality, that payment of any such instalment, or part thereof, which is about to become due shall be deferred, or that any future instalment, although not due, shall be paid on a date to be fixed.

12. Interest on deferred instalments at the rate of 4½ per cent. shall be payable by the landholder, and shall be the first charge upon his holding. Interest upon instalments paid in advance at the rate of 4½ per cent. shall be payable by the Government to the landowner, provided he is free from all arrears in respect of land-revenue. If he has any such arrear, the interest accruing on such payments in advance shall be from time to time credited to him in abatement of such arrear.

13. Every landholder shall be provided with a pass-book, in which his revenue account shall be entered and signed by the revenue official: this shall be a counterpart of the revenue account at the tahsil.

14. The Collector may, if satisfied that a landowner is guilty of fraud or neglect, put in force against him the ordinary provisions of the revenue law, and of those parts of the Civil Procedure Code which relate to insolvency.

AGRICULTURAL INDEBTEDNESS¹.

JHANSI.

[The documents referred to in this Note are—

(1) Mr. La Touche's Report on Pergunnahs Garotha and Moth, and Mr. Porter's Report on Pergunnah Mow, and the Proceedings of the North-Western Provinces Board of Revenue thereon—

Report on Garotha	-	-	1st February 1877.
" Moth	-	-	12th June "
Minute by Senior Member	-	-	8th October "
" Junior	-	-	20th March 1878.

(2) North-Western Provinces Government to India - 19th October "

(3.) India to North-Western Provinces Government - 14th March 1879.]

On the 19th October 1878, the Government of the North-Western Provinces addressed the Government of India on the subject of the remedial measures necessitated by the exceptional calamities of three pergunnahs

¹ Chapter 1. Section 14.

in the district of Jhansi. Speaking of the condition of this part of the country, which is described "as one of overwhelming indebtedness and ruin," the Lieutenant-Governor enumerates among its causes—

- (1) the fatal gift of proprietary right, the administrators of the country having turned the headmen, who had, under former Governments, enjoyed some rent-free lands in payment of their services in collecting revenue, &c., into proprietors.
- (2) the fact that the British Government obliged the people to pay a second time the revenue which had already been exacted from them by the Orcha State in the Mutiny.

¹ See Ajmer Revenue Regulation, 1877, where the restriction is to alienations for life.

² Ajmer Courts Regulation, 1877, Secs. 80 and 81. Most of these articles are already exempted.

³ North-Western Provinces Government to Government of India, No. 3143A. of 19th October 1878.

(3) a series of bad seasons combined with unrelaxed revenue demand:—"The crops of 1867 were a failure. The year 1868-69 was one of famine; one-fourth of the whole stock of cattle in the district died, and the poorer classes emigrated to Gwalior or Malwa, or perished from starvation or disease. *In the midst of this distress the British officials were inexorable in demanding payment of the revenue, and, in order to pay it, the people were obliged to commit themselves to written contracts of the most one-sided and ruinous character. They thus fell an easy prey to the money lender, whose exactions the Civil Courts have not been slow in supporting. The famine and the injudicious action of the Revenue authorities had reduced the people to a state of absolute poverty.*"

2. This poverty is summarised thus—The ascertained debts of the revenue-paying proprietors in three pergunnahs are reported as 16½ lakhs, and their annual profits fall short of their annual liabilities by some Rs. 80,000 a year, which is running on a compound interest. A specimen of the way in which debt accumulates is given in the case of some zemindars, who ten years ago borrowed Rs. 3,600 of "the most respectable firm in the district." They have since paid Rs. 6,999, and the account, when last balanced, showed the debt to be Rs. 9,766.

The zemindars, it is needless to add, "are quite destitute." population is diminishing, cultivation has decreased from 258,000 to 231,000, and an area of 37,800 acres is infected with a weed (khus) which only capital can eradicate.

3. The Government of India considers that the North-Western Provinces Government has laid too much stress on the transferability of land as a cause of misfortune, and attributes the disaster more to "the primary mistake in the Settlement Administration," viz., a disregard of existing relations between agriculturists and landholders, and the introduction of "relations at variance with their character, repugnant to their antecedents, and therefore not such as to admit of healthy development." In Jhansi the tenures were ryotwari, and a zemindari settlement was imposed. The result has been that "all classes of agriculturists have suffered; the mass of ryots have lost the quasi-independent positions which they formerly held, and the elevation of those selected to be proprietors, who had no rightful claim to the dignity and were unfitted for its duties, has ended only in their ruin. The fundamental error was not the gift of property as such, but the failure to adjust the institutions introduced to the existing phase of the society affected."

4. The Government of the North-Western Provinces proposes legislation on the lines of various Acts now in force for dealing with indebted classes in Chota Nagpore, Sind, Broach, Kaira, &c.; appointment of managers, &c.

5. The Government of India proposes two alternative plans. One is to have an insolvency law for the hopelessly involved, and to advance money to the others on security of their holdings, foreclosing and reducing them to occupancy tenant in case of default of payment:

This would be accompanied by a fluctuating revenue.

6. The second plan aims at reconstituting society on its former basis. Government would be armed with compulsory powers of buying up, at a rate to be fixed by law, the proprietary rights of such landlords as were involved; out of the sum thus realized the equitable claims of the creditors would be, as far as possible, discharged: a specially constituted tribunal would ascertain summarily all claims; if the debts did not exceed, say, five times the revenue, the zemindar would receive a certificate specifying the amount and interest payable thereon; if the debts exceeded five times the revenue, the village would be reconstituted on the ryotwari tenure. The creditors would be paid off out of the proceeds; the solvency of the cultivators would be preserved by a fluctuating revenue; the ex-zemindar would

become ryot of his "sir," the other tenants would be ryots of their several holdings, occupancy rights would be heritable, but not transferable *inter vivos*; headmen would be appointed in the villages, and would receive a percentage on their collections; besides the fluctuating revenue the cultivators would be helped by liberal advances for cattle and seed grain.

7. The second plan suggested by the Government recognizes a principle which the Commission might with propriety enforce, viz., that, though there is on the whole an advance in prosperity, there are portions of the country and classes of people whom our administration does not suit at all, and who, under arrangements designed expressly for their benefit, sink into a worse plight than that which under a Native regime was the normal condition of the general population; that with these classes of persons it is in vain to go on with institutions which obviously work badly; and that the wise course is to see, in each case, what were the changes which British rule has brought about, and how best we can recur to the former state of things, under which, at any rate, society did not absolutely collapse, and replace the administration on a basis more suitable to the character of the people. Many instances present themselves: in the present case, a zemindari system imposed on a ryotwari community, and the newly-created zemindars have brought themselves and their tenants to utter ruin; in Sind the converse operation took place; in numerous cases, everywhere, it seems to me, where the seasons are uncertain and the people not above the average, the introduction of our fixed revenue demand has driven them into the money-lenders' hands, while our courts and procedure have furnished a far too effective instrument for the enforcement of the money-lenders' demands.

What seems to be wanted is some machinery for bringing the best ability of the Government to bear forthwith upon these acknowledged failures, which the Government of India has described, in the case of Jhansi, as "a blot upon the administration." The state of things in Jhansi, apparently, has been known for many years, yet the machinery for improving it is extraordinary slow in getting into motion; the Senior Member is six months before he can write his Minute upon the Report; the Junior Member takes another six months with his; the North-Western provinces Government takes another six or seven months to frame its letter to the Government of India; meanwhile the compound interest debt, which increases at the rate of Rs. 80,000 per annum is running on, and the condition of the patient becoming hourly more desperate, while the doctors at their leisure are discussing the most appropriate remedy.

We ought, as it seems to me, to suggest that the local Government should be bound to submit at an early date a report to the Government of India on any part of a Province which exhibited symptoms of abnormal distress; with an examination of the causes and a scheme for remedying them. Such a Report would naturally come to the Department of the Government specially in charge of agriculture and agricultural statistics, famine relief and cognate topics, and would be dealt with on the recognised principles regulating this branch of the Administration either by such an attempt to reconstitute society on its former basis as is described in the Government of India's letter, or, in less serious cases, by putting in force some or all of the provisions of the Agricultural Insolvency Act¹, which would contain the machinery for setting an embarrassed community on its feet again. The general upshot of my contention is that I think the existence of unhealthy members of a body corporate, which is on the whole a healthy one, ought to be more expressly recognized; the probability of communities or classes from time to time getting into trouble more expressly provided for, and that it should be the express business of a specially qualified official and specially organized department to deal with such cases. At present the family may be said to be a thriving one, but there is no sick ward, and the invalids get insufficient attention and perhaps unscientific treatment.

5-9-79.

H. S. C.

¹ No. 152, India to North-Western Provinces, 14th March 1878.

² Para. 6.

¹ Please see my Note on the Deccan Ryot.

THE INDEBTEDNESS OF THE LANDED CLASSES, BY MR. C. A. ELLIOTT.

SECTION I.

THE JHANSI CASE.

(The materials for this Note are the same as those at the head of Mr. Cunningham's Note, together with the Jhansi Settlement Report.)

Three different hypotheses are put forward to account for the present state of indebtedness among the Jhansi landholders. The first, to which great weight is attached by the Government of India, is that it is due to the error made by the North-West Provinces Government at the time of settlement, when ryotwari tenures were transformed into zemindari; and the remedy proposed is to undo this mistake. The second, to which Mr. Cunningham seems to attach the chief importance, is that the cause has been the rigidity of the system of collecting the land revenue; and the remedy proposed is to introduce greater elasticity in this respect. The third hypothesis, and the one which is, on the whole, adopted by the North-West Provinces Government, is that the cause lies in "the one-sided and usurious terms" on which the money-lenders advance loans, and the "dishonest advantage they take of the ignorance and necessities of the zemindars," and the remedy proposed is an Encumbered Estates Act, under which these estates should be managed or nursed by Government officers.

2. The object of this Note is to attempt to show that the first two causes adduced have little, if anything, to do with the present embarrassment, and that the third is the main cause, and the only one to which drastic measures should be applied.

3. In the 7th paragraph of their letter of 14th March 1879 the Government of India write that though it is difficult to say which out of a variety of causes has contributed most to produce the result complained of, still the primary mistake was that made in imposing a zemindari settlement where the tenures were ryotwari. "In Jhansi all 'classes of agriculturists have suffered. 'The mass of the ryots have lost the quasi-independent positions they formerly held, and the elevation of those selected to be proprietors, who had no rightful claim to the dignity, and were unfitted for its duties, 'has ended only in their ruin." I venture to think that this sentence is, to a considerable extent, mistaken. It seems to imply a wider difference between a zemindari and a ryotwari settlement than need actually exist. In the purest instances of "Bhyachira" tenures or village brotherhoods in Oudh, the North-West Provinces, and the Punjab, where the proprietary body cultivate the whole of the land, and none is held by tenants under them, the tenure is called zemindari, but it is, in all its important incidents, identical with ryotwari. The chief principle in which they differ is that of mutual responsibility, by which, in the North-West Provinces, a solvent shareholder may be called on to pay the revenue due by the defaulter, and this cannot happen to a ryot in Bombay; but in Jhansi it is expressly stated by Mr. La Touche that this principle of mutual responsibility was never put in force, and is a dead letter,¹ and he asserts, in the same place, that the tenure there "is practically 'ryotwari,'" and that "the holdings are now as purely 'ryotwari as in the time of the Marattas."

4. It is hardly my place, or my present object, to defend the action of the North-West Provinces Government of 1853, but considering how prone we are in India to throw stones at our predecessors, perhaps I may venture to put in a plea in their justification. When it is said that, at the commencement of our rule in any part, a mistake was made in not framing a ryotwari or a zemindari settlement, as the case may be, there is some danger of forgetting how much any system framed by us for securing legal rights in land must differ from the system which we superseded. Neither our ryots, nor our zemindars, nor our occupancy tenants, exactly correspond in status with the classes that occupied the same position, or bore the same name, under Native rule. When Jhansi was annexed, we found in every village a body of men who cultivated the land, but were considered superior in rank to the rest of the cultivators, and,

as being descended from the founder of the village, received a title of respect from their fellows,—who were paid a yearly sum of money by the Maratta Government for performing the duty of "keeping up the cultivation," that is, protecting the weaker cultivators, and keeping them in heart,—and who were sometimes, but not always, employed in collecting the Government land tax from the rest. If these had all been reduced to one dead level, and made owners only of the plot they cultivated, while a single member was selected to be the village head or patel, would there not have been some reasonable discontent? If, on the other hand, we had said to them, We will still look to you as a body for the management of the village, and will entrust you with the collection of the land tax, and give you ten per cent on the amount for your trouble, but you must not enhance any rents, or disturb any tenants in their occupation of land, we should have made a zemindari settlement, as it was understood in the beginning of the century, and should have made it with the minimum of disturbance.¹ As a matter of fact we gave them first 30, and then 50, instead of 10 per cent. on the collections, a change apparently in their favour; and we omitted to fix (in some cases) the rents which they could demand from the other cultivators. This was the real blot on the settlement, not that it was not ryotwari, but that special steps were not taken, as might have been done had the rules for settling the "Sangur and Nerbudda" territories² been followed, for securing all the rights of the cultivators. And this error was pointed out and lamented by Sir W. Mair in the Review of the Jhansi Settlement,³ written by me under his orders in August 1873.

5. Not, however, that the cultivators excluded from the settlement were altogether neglected. A passage in Mr. Jenkinson's Settlement Report⁴ shows the actual distribution of the holdings.

	Acres.
Land cultivated by the proprietary classes	170,780
Land cultivated by tenants holding at fixed rates not liable to enhancement	57,518
Land cultivated by tenants holding at fixed rates, but liable to enhancement	55,699
Tenants at will	125,002

Now suppose that in 1853 a ryotwari settlement had been made, what would have been the result? The proprietors would have been made ryots in their own holdings, as they are now. The tenants at fixed rates not liable to enhancement are in exactly the position of a Bombay ryot, so there would have been no change there. The tenants liable to enhancement would not have been so liable, but it is shown by Messrs. La Touche and Porter that rents have fallen rather than risen, so it is presumable that there has been no enhancement, and the position of these tenants would have been practically, though not theoretically, the same as it is now. The tenants at will had held in 1867 (when Mr. Jenkinson wrote) for less than twelve years, and therefore they were not cultivating in 1853; their land either was not cultivated at all, or was held by men who have disappeared; under the Bombay system the larger ryots would have added such lands to their occupancy and cultivated them by sub-tenants; under the zemindari system the proprietors put in tenants in will; these cultivators would have been in nearly the same position whichever system had been adopted. There would, therefore, have been hardly any difference felt by the non-proprietary cultivators, and it is scarcely correct to say that they have lost the quasi-independent position they held. Under the Bombay system the proprietors would have been recorded as ryots owning about 296,000

¹ This seems to have been very much what Sir Dinkar Rao did when he made his Zemindari Settlement of Malwa in Sindhia's territory in 1860. See Central India Administration Report for 1870-71.

² Para. 34.

³ Para. 371.

⁴ See para. 40 Report on Pargana Garotha.

⁵ *Ibid.*, para. 41.

acres (their own and those of the tenants at will), and the other cultivators as ryots of 113,000 acres. Under the zemindari system the proprietors were recorded as owning 409,000 acres, subject to the rights of cultivators, who practically are in the same position as ryots, over 113,000 acres. The real difference between the two systems does not consist in the lowered status of the non-proprietary cultivators, but in the increased advantages conceded to the proprietary cultivators, who now pay half the full rates on their 296,000 acres, and a difference amounting to nearly a half on the 113,000 acres.

6 If I have been successful in showing that the zemindari settlement did represent the previous state of things more nearly than a ryotwari would have done, then it is reasonable to alter slightly the words of the Government of India, and to say that "the fundamental change was the gift of property as such." Either system would have introduced this change. As ryots they would have suddenly acquired the right to mortgage or to borrow on the 296,000 acres; as proprietors they acquired this right on 409,000 acres, but the moderation of the zemindari settlement made this right still more valuable, and exposed the new zemindars to a temptation they could not resist.

7. On these grounds I venture to think that the Government of India were mistaken in supposing that the fact that a zemindari and not a ryotwari settlement has been made was one of the causes, still more that it was the main cause of the Jhansi breakdown; and if this is so, then the remedy they propose of buying up the zemindars' rights and settling afresh on a ryotwari basis will not be required. Indeed, it is obvious, from the calculations made as to the value of these rights, that the fact has been overlooked that the zemindars, if turned into ryots of the land they occupy, would still be the proprietors of the greater part of what they own now, and would only lose their rights to a certain portion of the rents paid by the non-proprietary cultivators.

8 I turn next to the second hypothesis, that the breakdown has been caused by the rigidity of the revenue system, and to the arguments that have been built up partly on this basis as to the necessity of a more elastic system of revenue collection. I shall not here touch on the general question, but only examine how far the facts bear out the conclusion that any such rigidity has been seen in Jhansi. At first sight it would seem to anyone who reads the papers that the prevailing note of our revenue administration was the extreme lightness of the land tax as first assessed, and the constant changes in it since that time. Ever since the settlement was made some one has been at work in some part or other tinkering at it and altering it. In the Mau pargana alone the revenue has been reduced by 25 per cent. Mr. Porter does, indeed, include among his causes of failure "the rigidity of our revenue system;" but if his report is closely examined it will be found to amount to this, not that no allowances were made for bad seasons, but that not sufficient allowances were made. His 4th paragraph shows how large were the remissions and suspensions granted every year since 1868-69. In that year of famine 21 per cent. of the revenue demand was let off. It may be said, and in fact it is said, that that was not enough; but granting that the objectors are right, the error lay not in the system of revenue administration, but in the failure of the district officer of the time to appreciate the extent and gravity of the calamity which had befallen the people. A reference to the orders issued at the time by the Lieutenant-Governor, Sir W. Muir, will show that he would have supported his district officers in remitting the whole of the demand if they had been able to prove that the people could not pay it without ultimate ruin. No severe pressure was put on, but the people were urged to pay as much as they could, and less than this could hardly be done in the interest of the State. I see nothing in the papers to show that they paid more than they could really afford to pay. In one instance in which the yearly accounts have been given (that of Garha, to be noticed more fully afterwards), it appears that the cultivators, without borrowing, paid up the whole of their rental, and if so the proprietors were surely bound to pay up in full a land tax which hardly exceeded half their receipts.¹

¹ I may perhaps add that, in my own opinion, formed after careful study of all the available records, the famine of 1868-69 was not so disastrous in its effects in this District, as has been thought by the officers who have lately written on this case

9. So, again, the North-West Provinces Government write (para. 7), that in the midst of all the distress of the famine, "British officials were inexorably demanding payment of the revenue," a sentence which hardly seems to represent the case accurately. When it is considered that out of a demand of Rs. 4,59,000, suspensions were granted to the extent of Rs. 1,86,000, or 40 per cent.,¹ and I believe none of this was ever collected. It is hard to conceive what system could have been less rigid in collecting the revenue than this, so long as any pressure at all was put on to induce those to pay who were able to pay.

10. Again, Mr. Cunningham speaks of the "introduction of our fixed revenue demand" driving the people into the money-lenders' hands, as if that were a novel principle brought in by us, and opposed to the former customs of the people. But the remarkable thing is, that in Jhansi the people had invented this very system of their own accord before our rule. The ordinary custom had been to classify the land according to its various soils, and to impose on each class certain rates per acre, called "Aman" rates; this was the theoretic demand, but at harvest time a valuation of the crop was made, and "if it was below the average, a proportionate reduction was granted; if the season had been favourable the whole amount was collected."² This, at first sight, would probably please the advocates of an "elastic revenue;" but in reality it was not so favourable as it looks; the "Aman" rates were the maximum rates possible, and the reduced amount still took all that the cultivator was able to pay. This system was found so severe that the people invented for themselves a set of so-called "village rates," first by making an all round reduction, which was supposed to be the equivalent of the annual variations from the full rate, and next by subdividing the classes of soils. In other words, they introduced a fixed average assessment, in the place of a fluctuating and elastic one. These village rates are the rates on which our settlement is based, but so moderate are we that, instead of taking the whole demand calculated at these rates, we take only half of it. The revenue administration of the district has therefore passed through these stages. First, under the Maratta Government, the demand was fixed at the highest rates possible, a reduction being granted when the whole could not be collected. Next, as an improvement on this system, an average of actual collections was struck, and rates fixed in accordance with it. Lastly, the British Government assess on the principle of taking every year only half the average amount formerly taken, and of that amount 40 per cent. was remitted in a famine year, which was more than the Marattas seem ever to have granted in reduction of their maximum rates. It really seems superfluous to say more to defend our revenue administration from the charge of having, by its severity, produced the Jhansi disaster. But if more arguments were needed, one would be found in the fact that the indebtedness includes Ubari villages, which pay a quit-rent only, as well as those which pay the full land tax. In Garotha, out of 14 Ubari villages, 10 are mortgaged.

11. I believe, then, that these two hypotheses may be put aside, and that the real cause of the disaster is that which Mr. La Touche points out in his 25th paragraph, "the fatal gift of transferable rights in the soil, and the establishment of civil courts in an ignorant population." The people have had famines before, and bad seasons, and cattle murrain, and have recovered from them all; the same misfortunes, though lightened by an extremely moderate assessment, have overwhelmed

Mr. Porter says that "kans were born of the drought of 1868-69." This is certainly a mistake. Mr. C. J. Daniell, who settled part of the District in 1863-64, informs me that kans were well known and widely spread in his time, though no doubt it has increased since. Mr. J. V. Sturt, who has had 20 years' experience of the District, writes, in his paper on "Irrigation in Bundelkhand," "from 1871, following the year of heavy rains, a large portion of the cultivated area . . . has been overrun with kans grass." Kans is kept down by constant ploughing, and the heavy rains of 1870 and 1871 made ploughing impossible. No doubt, too, the loss of cattle in 1868-69 contributed to this result. Compare the figures quoted in the margin of para. 12 as to the payments in Garha, which fell off notably in the years 1870 and 1871.

² See para. 26. Board of Revenue Letter to Government, North-West Provinces, 25th August 1871, in the Jhansi Settlement Volume.

³ Mr. Jenkinson's Report, para. 133-4. Mr. La Touche disagrees, on the ground that the Aman rates only exceeded the actual collections by about 10 per cent.; he allows, however, that they were high.

them now. The one new element in the case is, that they have now what they had not before, an extremely valuable property in the land, together with the right to sell or mortgage it; and that while they used that right as children, our courts have held them to their contracts as if they had been grown men, and the first and most essential step seems to me to be the institution of courts which will revise these contracts, and will see that the money-lenders get a fair and equitable return for their money, and no more.

12. The extraordinary unfairness of these contracts does not seem to have been dwelt on as fully as one would have expected, either in the letter of the Local or the Supreme Government, although the facts are clearly set forth in Mr. La Touche's Garotha report. I will recapitulate some of them, because they seem to me totally at variance with an opinion that has gained ground lately—that the bania is not a bad creature after all, and does not take more than he is entitled to by the risks he runs—whereas, in many cases in Jhansi, he has run absolutely no risk at all, and yet has lent money on terms which bring him in a profit altogether beyond the ordinary profits of his profession, and terms which the proprietors would never have agreed to had they not been infants in their dealings with their creditors. We have seen how light the assessment is, and how large and secure a margin of profit it leaves. Yet in one case¹ a man borrows money at 36 per cent, pledging his landed property for the amount; in another he not only pledges his property, but agrees that the mortgage shall become an absolute transfer if he does not repay the principal of his debt, with interest at the rate of 24 per cent., in a year. In a third case,² the proprietor, owing a debt of Rs. 500, agrees to give over his estate to the creditor for 10 years, he, meanwhile, paying rent as a cultivator (that is, double the land revenue), with a drawback of Rs. 60; and unless at the end of 10 years he repays the principal and interest at 6 per cent, the land is to become the creditor's. If the man had been capable of making a contract, he would have seen that he could never hope to repay principal and interest when he had handed over all the proprietary profits of his land except the sum of Rs. 60 per annum. But the Garha case, of which full details are given,³ is a still more flagrant instance of the incompetence of the zemindars to enter into a contract with the money-lender on equal terms. They owned an excellent property, a village which had to pay (including all expenses) about Rs. 1,340, and the full rent roll of which was about Rs. 2,500, leaving a clear profit of Rs. 1,160, and they owed Rs. 3,600. They agreed to pay their creditor, in 12 years, Rs. 12,680, or nearly four times the principal; they secured him from all risk by making over to him the collection of the rents, and they consented, if over the surplus fell short of the instalments required to make up the Rs. 12,680, to pay 24 per cent. on the deficit. On these terms the money-lenders in ten years cleared Rs. 7,000, and yet the debt ran up to Rs. 10,000 or Rs. 11,000. If dealings so extortionate as these are sanctioned by the Civil Courts, it is impossible for the zemindars ever to escape from the clutches of their creditors. And here it may be observed that the accounts of this village, which Mr. La Touche gives for each of the ten years, may be cited in answer to the arguments of those who assert that it is the rigid exaction of the Government revenue and not the oppression of the money-lenders that impoverishes the people. The full rent roll was about Rs. 2,500, and in the famine years of 1868 and 1869 this was paid to the mortgagee

almost without any defalcation; it was after the famine, in consequence of the spread of "kans," that the rental began to fall off. The total payments of the ten years, deducting what was borrowed in cash to make up those payments, amounted to Rs. 20,400, or Rs. 8,000 in excess of the Government revenue, and yet the debt grew from Rs. 3,600 to about Rs. 10,000; if half the revenue demand had been remitted, that is, if it had been reduced to 25 per cent. of the rent roll, still the zemindars would not have gained anything, the money-lenders would have swallowed up all the profit, and the original debt would have been undiminished. No system of assessing the land tax or of collecting it in an "elastic" manner, that can be devised without injustice to the State, could have done anything for the relief of these landholders after the monstrous and unfair contract with the money-lender to which they had put their hands. The last case I need mention,¹ that of the village Dogara, still further illustrates the same argument; here the revenue demand was Rs. 1,172, the rent roll Rs. 2,853, and the actual collections Rs. 2,790; there was no room for "elasticity," and if rigidity of demand were the sole or the chief cause of distress, these zemindars at least ought to have been free from it; yet they are hopelessly encumbered, because their land is mortgaged to pay for debts on which interest is running up at the rate of 36 per cent.

13. I submit that the first thing that should be done is to establish a Court which shall annul these iniquitous contracts, and decree to the money-lenders a fair and equitable return for their money, and no more. In a case like that of the village Garha, where Rs. 7,000 have been paid in 10 years for a debt of Rs. 3,600, secured so as to be absolutely free from risk, it would probably be decided that 12 per cent. was an ample rate of interest, and at this rate the debt would have been paid off, and the village would start clear. The same result would probably be obtained in many other cases, and in all the load of debt would be enormously reduced, even without calling in the aid of the Hindu principle of "Dam Dupat," which, as interpreted by the Bombay Government in the Dekkan Ryots case (viz., that payments should never exceed double the original sum borrowed), would doubtless clear away almost every debt, and leave the proprietors free throughout the district. Where any large amount of debt remains, instalments would be fixed according to the surplus left after deducting the land tax from the rent roll, and the zemindars would be bound to pay these instalments in along with their revenue, the money passing through the hands of Government to the creditors. This is, I understand, the principle adopted in the case of the Broach and Ahmedabad talukdars, as opposed to that adopted in the Sind case, where the estates are managed by Government officers. It obviates the objection raised by the Supreme Government to the scheme proposed by the North-West Provinces, that if we take the management of the land out of the zemindars' hands while the process of paying off debt goes on, they will lose the habit of ownership and the experience gained by past errors, and, when the estates are handed over to them again, will plunge anew into follies and excesses. Where the margin of profit is so large that every debt can easily be paid off, if only a proper rate of interest is exacted, it seems clearly better to employ the zemindars, and not to put them aside in favour of a body of Government officials. This remedy can be adopted when any zemindar defaults in paying up his instalments.

14. For the future, in order to avoid a recurrence of such evils, three courses seem to be open to us. One is to abolish the right of transfer, as proposed by the North-West Government, in the case of all zemindars in whose favour the Equitable Court has interfered to save them from the consequences of their own improvident contracts. This would no doubt be effective, but it is open to obvious objections which I need not recapitulate, as they involve questions of general principle known to everybody; and also I fear that it may not go far enough, inasmuch as some of those who have not hitherto entered into such contracts may do so in future. The second course is to impose a heavier land tax, and thus to make the proprietary right a less valuable article of transfer. It may seem cynical to propose heavier taxation as a remedy for indebtedness, but I am so persuaded that the extreme, the excessive moderation of our demand has been at the root of the disaster, and that it is an economic mistake to surrender so large a margin of profit to unimproving landowners,

¹ Garotha Report, para. 28.

² *Ibid.*, para. 29.

³ *Ibid.*, para. 30. They may be abstracted thus,—

Year.	Receipts from the Village.	Payments on account of the Village.	Money Lender's Surplus
	Rs.	Rs.	Rs.
1866-67	2,325	1,349	976
1867-68	2,430	1,503	927
1868-69	2,434	1,406	1,028
1869-70	2,020	1,450	570
1870-71	1,873	1,329	554
1871-72	1,381	1,343	38
1872-73	2,050	1,250	800
1873-74	1,978	1,271	707
1874-75	1,978	1,264	724
1875-76	2,018	1,262	756
Total	20,487	13,417	7,070

¹ Garotha Report, para. 34.

that I do not shrink from the danger of being misunderstood in making this suggestion. Lastly, it would be possible to keep the Court of Equity always sitting, in supersession of the ordinary Civil Courts, and thus no such intolerable load of debt would ever grow up

again to crush the proprietors. In the next section I shall attempt to show that the latter course alone will probably be sufficient for the protection of the landed classes, if the scheme I suggest is found to be workable.

SECTION II.—THE SUBJECT TREATED GENERALLY.

The remarks in the previous Section treated only of the case of the Jhansi zemindars. But although this is the leading instance of indebtedness due to contracts entered into by persons too ignorant to understand the real effect of what they were undertaking, and to see that the interest asked was out of all proportion to the risks incurred by the money-lenders, still the same sort of thing is going on all over India in a greater or less degree, and, so far as it goes on, the remedy which I have proposed in the Jhansi case would apply. I wish to submit, therefore, for the consideration of the Famine Commission, whether it would be possible to give a general application to the arguments used and the remedy proposed in the first part of this Note.

2. The evidence presented to the Commission, and the inquiries made during our tour, have led me to the conclusion that there is not the same relation between the rate of interest charged and risk incurred which one would have expected to find in commercial transactions of this kind, but that (as a general rule, subject no doubt to special exceptions) the rate of interest is still governed by custom, and has not been materially altered either by the increased stocks of money in the hands of lenders seeking for investment, or by the increase in the value of property possessed by the borrowers.¹ The general tenor of the replies on the first head has been that the effect of the greater abundance of money has been mainly to induce the banias to lend larger sums to individuals, but not to compete among themselves for substantial debtors by offering lower rates of interest; and on the second head it was positively asserted that, in the parts of Hyderabad where proprietary rights have lately been bestowed by the Nizam's Government on the ryots, there has been no change in the rate of interest at which they borrow, although they are now able to offer so much more valuable a security. It is a point on which I should be sorry to speak with positiveness (although it would be easy for the Government of India to secure positive information if it were thought necessary), but my impression is that there is very little difference between the rates of interest charged in Native states where no Civil Courts exist, and in our territories where the Courts are mainly employed in assisting money-lenders to recover debts; nor between the Punjab, where they cannot touch the land, and the North-West Provinces, where they can strip a landowner to the skin in satisfaction of his bond. At any rate, it would be difficult to conceive of higher rates being charged than those extracted in the preceding Section from the Jhansi pile of reports, or those mentioned by Mr. Colvin as having been agreed to in Bijoor in 1877-78.

3. While one main reason for this inertia in the rates of interest arises from their being settled by custom rather than by competition, another undoubtedly arises from the fact that the risk incurred is still much greater than it need be.² Syud Ahmed Khan goes so far as to say that it is easier for a creditor to recover his money by the power of sitting "dharna" on a debtor in a Native state than by suing him in a Civil Court in a British district. To the same effect is Sir A. Hobhouse's often quoted remark, that when a man has got his decree his troubles are only begun. Our Courts are undoubtedly a better machine for giving decrees than for executing them, and the difficulty of getting possession of the land is so great, the expenses so endless, and the delays so exasperating, that it is no wonder if the money-lender does not appreciate the value of the security offered him in a mortgage as highly as we may think he should do, if the mere marketable value of its net profits were considered. Any scheme, therefore, which will diminish the risk, and make the bania more secure of getting a return for his money, will justify the Court in reducing the rate of interest, when that rate was agreed to on the understanding that the affair was a risky one.

4. From this principle is developed the plan which I offer as a solution of our difficulty. It is this: That there should be in each district or part of a district a

Court¹ which should be specially empowered to hear claims for debt against landowners; that those claims should be examined, and their amounts cut down to what would be fairly due if only such interest were charged as would be sufficient for a loan involving little or no risk; that instalments should be fixed which would pay off the debt in a given number of years, and that those instalments should be collected by the Tahsildar along with the land revenue, and paid over to the creditor.

5. In order to carry out this scheme,² it would be necessary in the first place to pass what would amount in practice to a usury law, and to say what the rate of interest which Government will allow in cases where it intervenes to remove the risk and to assist the creditor. That rate might be fixed at something between 6 and 12 per cent per annum; 6 per cent. being the rate now usually paid by Native merchants when they borrow from each other as a temporary convenience, and something above this being necessary in India in the case of all profits dependent on the land and the weather. Probably 9 per cent. would be a fair rate for good properties, where the margin of profit is large, and the land fertile and protected from seasonal calamities; 12 per cent. in the case of inferior estates. Next, a period must be fixed during which all existing mortgage claimants should come forward to prove their claims, if they desire the help of the Court in recovering their dues. The object of this is to prevent a priority being obtained by the collusion of the debtor with one of his creditors. The next process would be, at the end of this period, to take up each landowner's case in succession, and decide what the gross amount of his debt is, after cutting down the interest to the rates indicated above. Then the Court would investigate his assets. In Upper India a zemindar who has a gross rental of Rs. 100 pays Rs. 50 as land revenue and about Rs. 15 in cesses. Rs. 10 must be set aside for the vicissitudes of the season, and Rs. 25 may be taken as the minimum annual profit he receives as a proprietor. In 19 cases out of 20 he himself cultivates a portion of this estate; if then, he is content to pay a cultivator's rent and to live on a cultivator's profit, he is able to pay his whole proprietary profits, or Rs. 25 a year in liquidation of his debts, or 50 per cent. on his Government revenue. Such an instalment will clear off a debt of Rs. 100 at 12 per cent. in six years, or of Rs. 200 at 9 per cent. (if the estate is a first class one) in 14 years. In Southern India the margin between the Government rates and a full rent is probably not so great, but the Revenue authorities would decide what the average profits of a ryot are. On such consideration the instalments should be fixed, and when fixed they should be collected with the land revenue and paid over to the creditor, who would then be freed from all trouble in executing his decree, and from almost all risk, advantages in return for which the reduction of the rate of interest named in his bond seems just and reasonable. A period to be established beyond which instalments should not run, say 15 or 20 years, and if the debt cannot be liquidated in this period the estate should be declared insolvent, and sold by auction.

6. Supposing the instalments to be thus fixed, two unfavourable contingencies may arise. The landowner may fail to pay the instalments. If this is due to exceptionally unfavourable seasons, the non-payment would be excused, and the interest due would be added to the principal; if it was caused by recusance or habitual extravagance it would be necessary, after exhausting the usual measures taken for collecting areas of revenue, to declare the man insolvent. The other contingency is that of his desiring to enter on a fresh loan during the time that his estate is still encumbered by instalments on account of old debts. In this case he would appear with his money-lender, and enter into a fresh agreement that after the expiry of the current set of instalments he would continue to pay on the same system for a certain number of additional years. It

¹ High interest in India does not mean bad security.

² Difficulty of realizing the security.

¹ Proposal to establish a Special Court for the determination of the debt and the collection of instalments with the Land Revenue.

² Details of the scheme.

would not be necessary to declare an encumbered landowner disqualified from borrowing or incurring any obligations, so long as the obligations take this form, and are registered in and enforced by the Courts.¹

7. The same method would also be applied in the cases of new loans raised by owners of unencumbered estates. A mortgage would no longer be an agreement entered into privately, and on very onerous terms, between the *banna*, taking all risks, and the landowner, assenting to terms he does not understand, but an agreement openly made between the parties before the Court, and on terms sanctioned and enforced by the Court. Any mortgage not so made would rank only as a simple unsecured debt, and no cognizance of it would be taken by the Court which alone would have jurisdiction in respect of landed debts.²

8. This scheme would, it appears to me, possess many of the advantages,³ and avoid many of the errors and difficulties attaching to all the proposals which have been before the Government of India, or the Famine Commission. It would avoid the objection rightly urged against the system usually followed in the treatment of our encumbered estates, under which the management is taken out of the hands of the landowners who are left to grow up in idleness, and are, as it were, divorced from the land, in order to give it to Government officials who have no special aptitude for such a charge. It would avoid the difficulty of declaring proprietary

rights to be non-transferable, a heroic remedy which would be unfair to recent purchasers and to all the most thrifty and intelligent owners, and which, even in the case of the more childish owners, would only save them for the present by stopping all growth in the future. It goes beyond the Deccan Ryots Act in leaving little to the equity and conscience of the Court, but laying down a clear rule as to rate of interest and as to the system of instalments. It also embodies the most practical part of the suggestions made by Syud Ahmed Khan for the creation of land banks, leaving out what is, I fear, impracticable, his idea that money-lenders would take shares in such a bank and subscribe money with which to pay off debts. The scheme would easily be carried out by the existing Courts, without requiring any additional expenditure or machinery, except during the first period, when the debts owing up to a given period have to be adjudicated, and special Courts would probably be required to deal with the rush of cases.

Lastly, it would vindicate the principle that Government has not altogether parted with its rights as a landlord, but should have an eye to the well being of those who are its partners in those rights, and should not leave them to be crushed or ruined by the mechanical application of legal principles or the rules of unrestricted competition and *laissez-faire*.

G. A. E.

11th December 1879.

THE BEHAR RYOT, BY MR. H. S. CUNNINGHAM.

The worst part of the worst famine tract in Bengal consists of the northern parts of the districts of Muzaffarpur, Darbhanga, and Bhagalpur, and lies within the sub-divisions of Sitamarhi, Madhubani, and Supul.¹ These parts suffered from famine most severely in 1770, 1866, and in 1874, and from scarcities in 1783, 1869, and 1876. The cause in every instance was the premature cessation, in September, of the monsoon rains, which should have gone till the middle or end of October—a danger to which this part of the country is especially liable.

2. In the Madhubani sub-division is the Pargana Alapur, with an area of 268 square miles. Almost the whole of this pargana, viz, 246 square miles, with 296 villages, 83,000 inhabitants, forms part of the Darbhanga Raj: it suffered, perhaps, more than any other in the famine of 1873 and 1874. A commission was appointed to enquire into the condition of the people, and reported that relief measures would be necessary, in order to enable the people to tide over the distress arising from deficient rainfall in 1875. The necessity for these relief measures was attributed to the normal poverty, which was reported to be such that the people "were not able, even for one season, to bear up against any serious failure of their crops." This poverty was traced to the prevailing rent rates, which, the Commissioners said, were "so excessive, that it was impossible for the ryots, in time of ordinary plenty, to save up anything for an evil day."

3. One of the results of this report was the appointment of an officer to carry out a field-to-field survey and reassessment of rent rates. Mr. Finucane, who performed this duty, gave evidence before the Commission, and his experience placed him in a position to give more specific information than is often obtainable in the Bengal Presidency as to the condition of the people.

4. The gross rental of that part of the Darbhanga estate that lies in the Alapur Pargana is four lakhs, the revenue is Rs. 1,810, i.e., less than the $\frac{1}{10}$ th part of the rental.⁴ The Government outlay, apart from what was spent out of the estate, then under the Court of Wards, on the pargana in famine relief in 1874, was more than 2½ lakhs, or considerably more than the State has received from the pargana from the date of the permanent settlement up to the present day. We start accordingly with the result that the Raja, being allowed to enjoy all the proceeds of this estate, except a tiny fraction, less than $\frac{1}{10}$ th, is further allowed to keep his people in a condition of such miserable poverty that a single crop failure plunges them into destitution, and

that then the destitution, so occasioned, has to be relieved, in part at least, at the cost of the general taxpayer, on a scale which swallows up all the revenue which the State has received from the land for eighty years.

5. The gross rental of the area assessed to land cess in Bengal, representing land revenue of 3,639,000*l.*, is returned for the purposes of local taxation at 13,000,000*l.*; so that the proprietors pay Government rather more than $\frac{1}{4}$ th of their admitted receipts.⁵ This is not so small a proportion as is paid by the Darbhanga Raj, but still it is small enough to raise the question how far these proprietors, who sweep off three-fourths of the profits of the land, perform their part of the bargain, under which they hold their estates, and how far it is equitable to call upon any other portion of the community to defray the expense of keeping their tenants alive in time of famine.

6. As regards Behar the condition of the people has long been a scandal to the Bengal administration, and the attention of successive Lieutenant-Governors have been directed to it. The Commission will probably remember the terms in which it was described to us by a local officer.⁶

7. Mr. Finucane's opinion is that the calamities of Behar are to be traced to its land-laws. "How comes it," he asks, quoting the language of one of the Commissioners in 1874,—"that with the present not very grave vicissitude of season, the Imperial Government should be expected to interpose in regard to a most fertile region, the great bulk of whose agricultural profits go elsewhere than to the imperial exchequer? How comes it that Behar, with an industrious population, the most fertile soil in India, a territory comparatively very lightly assessed in land tax—how comes it that this Behar should be seeking imperial relief oftener and more extensively than the regions less fertile, and far less heavily assessed by Government? The explanation, then, as to why the three northern sub-divisions should not tide over the vicissitude, by falling back on food reserves, or on money resource, summarises itself briefly thus. The whole conditions of agricultural industry there are such as to render it precarious. There is no sufficient certainty as to tenure. It is impossible for the population to fall back this year solely on accumulated reserves, whether of grain, of property, of money, or of credit. For the whole conditions of life, as will be seen from the collector's reports, are such as to preclude any sufficient accumulation of the kind. The ryots cannot

¹ Two difficulties to be expected.

² Extension of the scheme to future mortgages.

³ Advantages claimed for the proposal.

⁴ Toynbee, p. 13.

⁵ Mr. Finucane's Evidence, p. 183.

¹ There are in Bengal 129,000 revenue-paying estates. 724,000 "tenures" holding under estates, 10 millions "ryoti holdings," of which 2½ millions are for annual rental between Rs. 5 to 20 and 6 millions under Rs. 5.

² Mr. O'Donnell.

³ Note on the defects of the Rent Law in Behar.

"fall back on any credit fund like the tenant-right of other parts of Bengal; for practically there is no such right available to offer in pledge. The people who plough and sow, and who ought to reap, have not a reasonable assurance as to the fruits of their industry."

8. Mr. Finucane's contention is that, "if the obligations which the law imposes on proprietors were vigorously enforced, the condition of the Behar tenantry would in a short time be so improved, that the failure of a single crop would not bring about a state of things in which the great bulk of the population has either to be supported by the State or to starve." "The local officers," he says, "have naturally shrunk from acting as partisans and from instigating ryots to resist the illegal acts of proprietors;" and thus the ryot, being "ignorant and very helpless,"—sunk in abject poverty and confronted with a law which makes every presumption against him,—seldom thinks of asserting his legal rights.

9. If this be a correct account of the policy pursued in Behar, it seems to me to imply a very erroneous view of a local officer's duty; he ought not to shrink from acting as the partizan of the weak in their attempts to resist the illegalities of the strong; he is bound to see that the law is not broken either by rich or poor; but he is especially bound to see that it is not broken by the rich for the purpose of oppressing and cheating the poor. "It is," Mr. Finucane says, "the opinion of experienced gentlemen that reforms must be introduced with great caution unless we are prepared to run the risk of alienating the proprietary classes, of fostering litigation, and of embittering the relations between landlords and tenants." When, as in Behar, the relations of landlord and tenant are those of a high-handed, unscrupulous proprietary class, breaking the law to increase their own illegal gains, on the one hand; and a tenantry, robbed of its rights through the negligence of their rulers and ground down under every form of oppression, on the other, it is absurd to talk about "embittering" them. So far as I can see, the administration in Behar stands in the discreditable position of countenancing, and so abetting, notorious abuses for fear of the commotion which would ensue if the people knew their rights and were encouraged to assert them. As to letting the Behar landlords trample on the law for fear of "alienating them," when we hear of their performing any one of the duties, for which they were created, or assisting the Government in any one of its endeavours for the good of the people, it will be time to consider how far their alliance is worth having.

10. "The Rent Law in Behar," Mr. Finucane says, "has been practically a dead-letter, mainly because the provisions intended to protect the ryot are chiefly declaratory of his rights, which he is left to enforce in the Civil Courts as best he can. The ryot is seldom able to stand upon his legal rights." What is required is the compulsory enforcement of zemindars' obligations, and not new declarations of right and title. What the law declares that a zemindar ought to do, that the law should compel him to do.

11. Mr. Finucane goes on to specify a number of particulars in which the law is habitually set aside by the landlords of Behar, the crowning illegality being the practice of forbidding the cutting of the crops until the tenant assents to and satisfies the landlord's demands. This is precisely in the teeth of Act X. of 1859, Section 118, and Bengal Act VIII. of 1869, Section 74.

12. Among other evils to which the Behar Rent Law system exposes the tenant are the following:—

- (1.) In some cases the landlord's rights are vested in several holders,¹ each of whom separately claims an aliquot share of the rent, which he asserts to be his due. It is unnecessary to dwell on the great hardship which such arrangement must entail on the tenant, its fatal effect in hindering improvement on the land, and the wide door which it opens to oppression and fraud.
- (2.) Another grievance is the prevalence of partition cases,² prolonged sometimes over one or more generations.
- (3.) Another cause of oppression in North Behar, and especially in Madhobani is the practice of

buying and selling the landlord's control and responsibility as regards the cultivator, including an almost unlimited power of distraint.³ These assignments are generally made for seven or nine years; the evil is intensified when, as is often the case, the right assigned is not that to claim the entire rental, but only some share of it. These assignments are frequently made without any due notice to the tenant and invariably without his consent.

- (4.) But the greatest hardship under which the Behar peasant labours is the process by which rent is recovered. On the eve of reaping-time the landlord or his assignee (thikadar) sends an official⁴ into the village with orders to recover the sum due and to prevent reaping until it is paid. In case of any delay this official levies diet-money on a penal scale for his residence on the headmen or villagers. The process is made as harassing as possible, in order to be effectual. The villagers believe that they are powerless; and forced sales on ruinous terms either to the landlord or general trader are the general result. In Madhobani Mr. Finucane heard many complaints on the subject, but "abstained from expressing anything which could be construed into order." "Any reform," he observes, "will require some care in introducing, as the feeling of the tenants is naturally very tense on the matter." In Soopul, the Magistrate-Collector, with the Commissioner's subsequent approval, issued a most salutary order to the police, directing them how to act on complaints from cultivators of not being allowed to reap their crops. The order was at once noised abroad among the villages, and at once produced a considerable sensation throughout the entire sub-division. One result of this has been that in many cases the rent-realizers have moderated in their requisitions, thereby enabling the cultivators to store grain instead of parting with it at forced prices."

13. His Honour the Lieutenant-Governor of Bengal⁴ has recently had occasion to consider the depressed condition of the Behar agriculturist, and his opinion accords entirely in accordance with those already quoted. "Behar," he says, "is, as a whole, too poor to buy up its own good harvests."

"Mr. Toynbee, the collector of Patna, who has devoted much time to investigating the condition of the labouring classes and small traders of his district, writes thus of them:—'The expression "living from hand to mouth" has assumed for me a more definite and tangible, if less satisfactory, meaning than it ever had before. I have been into and over the houses of hundreds of *telis*, *banijyas*, *gwallas*, *halwais*, and other similar castes, and have seen how they live, and what they eat. I could not have believed, had I not seen it for myself, how abject is their poverty. Hunger satisfied, and decency propitiated, they seem to have no further ambition. Many of them do not know what it is to have two meals a day, and most of them do not know when they rise in the morning whether they will get one full meal or not. Wages have remained as before, while the prices of all kinds of food have increased. Over-population seems to be an effectual bar to any further material improvement that might otherwise be brought about by increased means of communication, by education, and other similar means.' Of the poorer classes in Sarun, the sub-divisional officer of Sevan writes:—'It is, however, a fact that the average size of the farms of the poorer classes does not exceed five bighas, and that seven persons, according to the census, constitute a household. The average value of the crops produced in one year, taking good land with bad, on a single bigha, is Rs 25, of which Rs. 3 is payable in rent. Therefore, amongst the poorer classes, that is some 600,000 persons, seven persons have to subsist on Rs. 102 a year, or only a rupee and four annas each a month. Yet even this condition represents a state of things much more favourable than half of the poorer classes, or 300,000 persons, can obtain. Tens of thousands of them

¹ Ijmalis Maliks.

² Batwaras.

³ Thikadari system.

⁴ Pyada.

⁵ Resolution on the Commissioner's Annual Report, 1879.

“ ‘ have not more than two bighas of land, and the
 “ ‘ number of those who have only two to three is
 “ ‘ equally great. There are besides the landless day-
 “ ‘ labourers, who number from 10 to 15 per cent. of the
 “ ‘ inhabitants of every village. How they contrive to
 “ ‘ subsist in years of scarcity, and particularly during
 “ ‘ such lengthened periods of dearth as the first five
 “ ‘ months of the official year under report, is a more
 “ ‘ difficult question than most people are prepared to
 “ ‘ answer. The fact is that the possessors of a larger
 “ ‘ kind of farms, with areas from 15 to 30 bighas,
 “ ‘ and even less, know the importance of preserving
 “ ‘ this class alive, and also of preventing them from
 “ ‘ emigrating through distress, and give them just
 “ ‘ enough food to keep body and soul together.
 “ ‘ Emigration is constantly proposed as the panacea
 “ ‘ for the domestic difficulties of Sarun; but so long
 “ ‘ as there is a large class of middle-class farmers,
 “ ‘ whose caste or pride restrains them from working,
 “ ‘ and who are prepared to devote all their influence
 “ ‘ and much of their substance to keep the really poor
 “ ‘ in the district, even when they have no work for
 “ ‘ them to do, so long will all schemes for diminishing
 “ ‘ the population by emigration infallibly fail.’ ”

14. “ ‘ It is evidently futile,’ His Honour goes on to observe, “ ‘ to hope that emigration will relieve Behar
 “ ‘ of any appreciable portion of its people until some
 “ ‘ change takes place within the province itself,
 “ ‘ which will have the effect of extruding superfluous
 “ ‘ population by making it practically impossible for
 “ ‘ them to continue there. Such a change can probably
 “ ‘ only be effected by a reform of the land-law. If the
 “ ‘ present dead-level of pauperised cultivators were
 “ ‘ once broken up, and if due protection were given to
 “ ‘ the ryots, and their tenures made secure and valuable,
 “ ‘ the standard of comfort among the land-holding
 “ ‘ peasantry probably would rise; the desire to increase

“ ‘ the area of their holdings would become effective, as
 “ ‘ the means to attain this accumulated; and eventually it
 “ ‘ might be hoped that the soil would be divided among
 “ ‘ just such a number of cultivators, with their de-
 “ ‘ pendent labourers, as it could maintain in the higher
 “ ‘ style of living that would necessarily follow upon
 “ ‘ growing wealth. Thus gradually an effective stimulus
 “ ‘ to emigration might be applied, serving to rid the
 “ ‘ country of its surplus population. All this, however,
 “ ‘ if it ever comes, must be the work of time.’ ”

15. A Commission, appointed last year by the Lieu-
 tenant-Governor to examine the subject, is still engaged
 upon it; and pending its report, it would perhaps be
 undesirable to suggest any remedy for so grave a
 disease, but that, as it appears to me, the case calls into
 question some of those general principles on which we
 may be expected to express a more outspoken opinion
 than the Lieutenant-Governor would probably think fit
 to elicit from his local officials.

16. We have in Behar (1) great climatic liability to
 famine; (2) a population so poor and oppressed as to
 be unable, in the opinion of the local officers, to offer
 the least resistance to any form of pressure; (3) a class
 of landlords who sweep off the entire margin of the
 profits of the soil, paying the Government a mere
 fraction by way of revenue, and trampling down the
 law in every direction where it would intervene for the
 protection of the tenantry. Such a state of things
 seems to call for remedies of the most searching and
 stringent character, and to invite an enquiry into the
 real character of the landlord's rights under the per-
 manent settlement, and of the legal position and duty
 of Government when those rights are found to be
 exercised in a manner which conflicts with the well-
 being of the cultivators. This question I propose to
 discuss in a separate note.

H. S. C.—10-10-79.

XII.—AGRICULTURAL BANKS.

MEMORANDUM ON THE IMPROVEMENT OF THE LAND AND RELIEF TO AGRICULTURISTS, AND ON THE ESTABLISHMENT OF AGRICULTURAL BANKS, BY SYUD AHMED KHAN BAHADUR.

This Memorandum consists of five parts—

- I. On the improvement of land.
- II. On the state of the agriculturists in respect of their transactions with the money-lenders.
- III. On the establishment of agricultural banks.
- IV. Certain remarks on famine.
- V. On the necessity of certain amendments in the existing legislation and the enactment of new laws.

PART I.

1. The improvement of the condition of land may be secured in three ways—

- Firstly*, by establishing the means of irrigation;
Secondly, by providing facilities in the way of irrigation;
Thirdly, by maintaining or improving the productive powers of the earth.

2. With regard to the first head, I take it for granted that in places where irrigation by canals is impossible wells are the only means of improving the land and saving the country from the calamities of famine.

The only fact which admits of discussion is the mode in which wells may be constructed in places where they are required; and it involves the following questions:—

- 1st. The class of wells in respect of the mode in which, and the capital by which they may be constructed.
 - 2nd. Their sites, cost, and the degree of their usefulness.
 - 3rd. Matters connected with persons profiting by the wells.
3. With regard to the first point, wells may be divided into four classes,—
- (a) Wells constructed by a landlord or a cultivator with his own capital and of his own free will.
 - (b) Wells constructed by a landlord or a cultivator with a loan taken for the purpose, under an engagement to pay the principal as well as interest, or
 - (c) Those constructed with a loan under an engagement of paying a permanent interest only.
 - (d) Wells constructed by Government or by a duly authorized company in a compulsory manner.

4. The second point above named has been the subject of much discussion and has given occasion to many reports, varying widely with each other in their estimates of the cost of such wells, the area irrigated by them, and the profits arising out of them. The Hon'ble Mr. Cunningham has, I think, expressed a correct opinion by saying that, "The cost of a well will differ in different places, and the area it can irrigate will depend on the nearness of the water to the surface, the quantity of the water, the crop irrigated, and the thirstiness of the soil." Hence I doubt the possibility of a general estimate of the cost and the usefulness of wells that may equally apply to all wells in all places.

5. The Hon'ble Mr. Cunningham in his Memorandum, and the Secretary to the Government of the North-Western Provinces and Oudh in his Letter, No. 3503A., dated the 2nd December 1878, have attached much importance to "the physical practicality of making wells, and the method of selecting sites for them." The Hon'ble Mr. Cunningham remarks:—"It must be remembered that all the best places have been taken up already; the tracts where there are no wells now are those in which the agriculturists have found it impossible or unremunerative to build them. Is it likely that Government will succeed better than they? What is known as to the conditions which made well-digging more difficult in some places than others? Does any department or any officer possess scientific knowledge as to the geological problem—the character and

position of the water-bearing strata that overlie them? Can the Public Works Department predict, by the use of an auger, or any simple tools, where a pukka well can be built? It is believed that in the Gangetic valley water can be found anywhere, and the mere putting down borer and coming on water proves nothing. The water may be a spring or a trickle percolation. Moreover, the main difficulty of making a well arises from the looseness or firmness of the sub-soil; it is necessary to know what the depth is of the sandy stratum which has to be cut through, and whether the sand is firm and dry, or loose and wet like a quicksand. Does the Department of Public Works possess tools which will give this information? If so, can they be used by non-professional persons, or only by experienced officers of the Department? And could the Department lend any number of such officers to the Civil Department to select sites for such wells?"

6. The Secretary to the Government of the North-Western Provinces remarks in his letter referred to above, that His Honour the Lieutenant-Governor has found much "diversity of opinion" as to the amount of pressure laid on the construction of wells, much "doubtful conjecture" as to the method and cost of constructing wells, "and almost complete ignorance" as to the extent to which the wells are required and where they are most needed. His Honour has therefore proposed that "two tracts (containing one or more villages under Government management) in which there are *prima facie* reasons for believing that wells can be constructed at a reasonable cost with advantage to the agricultural community be chosen in different parts of the Province." His Honour suggests the desirability of special enquiries, though admitting that "intimate acquaintance with the requirements of one tract . . . is no safe guide to a knowledge of the needs of another, even in the same neighbourhood." The questions which ought to be the subject of such enquiry, His Honour thinks, are "the depth at which water will be reached; the depth of water when reached; the abundance of supply; the condition of strata to be penetrated, or in which water lies; the character of the water itself; the cost and supply of material and labour in each locality; the size of well most adapted to the place; the nature of the soil to be irrigated; the kind of crop which can be raised; the class of cultivators by whom it will be utilized; the relations, amicable or otherwise, which they bear to each other and to their landlords; the distance which water has to be taken from the well; the extent to which irrigation is already available in the neighbourhood," and such like. His Honour suggests the ultimate establishment of a "separate agency," if such local enquiries succeed in their object, "whose principal duty it will be to study the agricultural circumstances of each locality in which it is proposed to construct wells, or rather whose principal duty it will be to study the agricultural circumstances of every locality not fully irrigated, in order to decide whether or not wells are there required." His Honour thinks that any district cannot be thoroughly inspected by one officer in less than two or three years, with a rough estimate of expenditure from Rs. 25,000 to Rs. 50,000 per district.

7. It cannot be denied, as the Hon'ble Mr. Cunningham has said, that Government can have no good chance of success in constructing wells in tracts where "the agriculturists have found it impossible or unremunerative to build them." But well construction should be limited to those localities only which present a good prospect of the success of the scheme. Such localities are still found in abundance, and will be much benefitted by an increase in the number of wells. Villages having a cultivated or arable area unirrigated by wells have ample room for measures of protection against famine, provided the area is not such as does make it impossible or unremunerative to construct wells; such villages are found in large numbers in the North-Western Provinces.

8. The physical question spoken of by the Hon'ble Mr. Cunningham in his Memorandum, and the enquiries mentioned in the letter of the Secretary to the Government of the North-Western Provinces, do not seem to present any serious difficulty. The object of the proposed scheme is to increase the number of wells in villages where they are not sufficiently numerous to ward off the calamities of a famine. We should rarely have to make wells in tracts where the landlords or the well-diggers, who inherit the profession from their ancestors, would not be well aware of the nature of the soil, or which would not have wells in their neighbourhood, giving a geological history of the locality. It is a fact, and can be ascertained by holding enquiries in each pargana, that in all villages the zemindars, the well-diggers, and the well-sinkers possess a good knowledge of the various strata of the earth and the depth of water in that locality, on account of the experience acquired by them and by their ancestors. They can well name the various strata of the earth above water in that locality, and can tell the order in which they successively occur, as well as the thickness of each layer. They do not of course possess any scientific knowledge of these things, but their information is derived from experience, which is the sole basis of all knowledge. The neighbouring wells give an unfailing evidence of the nearness of the water to the surface of the earth, the abundance of supply, the thirstiness of the earth, and the extent of the area irrigable by any sort of well; and we can make an estimate of the cost of a well in a certain locality with tolerable accuracy. These are the points which are to be known before the construction of a well is undertaken, and can be easily ascertained by the agency of Native officials under the supervision of the ordinary local officers.

9. These questions do not present any serious difficulty and can be easily solved. But the question whether the zemindars and cultivators will agree to make wells in the manner stated in clauses (a), (b), and (c) of paragraph 3 involves some difficulty. There may be a few wells constructed in this manner. I have fully considered the laudable effort that has been made in the pargana of Ghatampur, Zilla Cawnpore, to try the experiment. But I do not think the measure will ever attain wide success. If the construction of such wells is brought about by the influence or exhortations of a certain officer, it cannot answer the real purpose of proving a protection against famine. This object cannot be attained until the zemindars and cultivators are themselves actuated by stronger motives and inducements.

10. I have talked with several respectable and wealthy zemindars on the subject, asking them what prevents them from constructing wells in their villages with their own capital or with advances of money from Government, and have found out the following reasons:—

- (a.) They can lay out their sums in trades more lucrative than the construction of wells.
- (b.) They have a strong impression that, in case they constructed wells, the Government revenue will be enhanced in proportion to the increase in the productive powers of the land as soon as the term of the settlement expires, and the profit they may be hitherto deriving will be greatly diminished.

The attempt which the Government of the North-Western Provinces has made, in its circular dated the 11th November 1877, to remove to some extent this apathy from the minds of the zemindars has failed to ord them satisfaction, and they cannot understand their fears are groundless.

are not convinced by the argument that they will obtain sufficient profit by the time the term of the settlement expires, at which they get from time to time a reimbursement of the advances made: and the loss they may have to bear in the Government revenue term will be viewed as a heavy expenditure on their expenditure. A respectable zemindar that I have met may have the effect of constructing wells in their

own area has been for cultivation, and much has reached its in the vicinity of a railway are likely ever to be means of improvement settlement may be

made permanent with the zemindars, subject to the condition of making a certain number of wells, i.e., the current settlement may be made permanent, conditionally on the promise of the zemindar to construct a certain number of wells in his village within a certain period.

- (b) In villages in which an increase of revenue is expected on the termination of the settlement period, a limit may be fixed for such increase, and an engagement be entered into with the zemindars, to the effect that if they construct a certain number of wells within a certain period, no increased demand will be made by Government on their villages as long as the current settlement lasts, and that after the termination of the period a permanent settlement will be made with them at an amount the limit of which has been so fixed.

- (c) Should none of these measures be acceptable to Government, the last resource should be that a zemindar wishing to construct a well in a village should be required to notify his intention to the collector of the district, who should define the boundaries of the area irrigable by such well, and shall, in conformity with the rules of *lutwara*, detach that area from the rest of the lands and fix a separate amount of revenue (the same as it now pays when dry) for it permanently: and the area shall be termed as a separate permanent *patti*.

12. The measures recommended by the able zemindar belong to the most important questions of administration, the solution of which is no easy task but they unmistakably lead us to an inference that to expect success in the system of well-construction by private capital, or by public money advanced to the zemindars for the purpose, is to expect impossibilities. If, therefore, there be a necessity (and I admit there is) of having the system of well-construction adopted on a large scale as a precautionary measure against famine, there remains no other alternative but that either Government should construct wells on its own account, or duly authorize a competent corporation wishing to undertake the work to bring it into effect.

13. The existing laws of the country do not even go so far as to allow that Government or an authorized corporation should be able to begin the work in an experimental manner. To think that Government will be able to try the experiment in villages that lie under its own management appears to me to be an unreasonable expectation. If the expectation be even realized, it will still fall short of producing a result that can properly be called the result of a thorough and efficient experiment. On these considerations I am in favour of the necessity of a law providing facilities for making an efficient experiment.

14. The passing of such a law will not necessarily necessitate the commencement of the work by Government or any authorized corporation at once all over the country. Government will, on the other hand, be empowered to enforce the measure in any tracts and to any extent it deems proper. Therefore the enactment of such a law, the enforcement of which will entirely lie in the hands of Government, can furnish no ground for apprehension.

15. The draft Bill prepared by the Board of Revenue, North-Western Provinces, on the subject in September 1878, though requiring a good deal of amendment, deserves special attention, and does not deserve to be thrown away as a dead letter.

16. With regard to the third point in paragraph 3, I beg to say that the settlement of matters connected with the occupants of lands that are irrigable by the wells involves no difficulty. I do not think, as appears from the Memorandum of the Hon'ble Mr. Cunningham and also from the draft Bill of the Board of Revenue, North-Western Provinces, that the occupants of the lands irrigable by Government wells should have to pay a water-rate; it is preferable that they should pay a wet rent to the zemindar of the land, on the score of its being irrigable, whether they use the water or not.

17. The Hon'ble Mr. Cunningham writes in his Memorandum that "in case of the adoption of the compulsory method of the construction of wells, Government could not, with any appearance of justice, say to him, 'You shall make your own arrangements for recouping yourselves from the tenants of the lands round the well;' Government must arrange for a compulsory rate to be paid by those lands. But the North-Western Provinces Government has already, it is understood, pronounced definitively against com-

"pnlsory rates in the case of canals; and I do not see how the two questions can be treated differently, or what arguments can be used for compulsory rates in the case of wells which do not apply equally to the case of canals."

18. The Board of Revenue, North-Western Provinces, say in section 10 of their draft Bill that "on all lands irrigable a water-rate, the amount of which shall be determined by the Local Government, may be imposed by the general or special order of the Local Government, and the rate may from time to time be altered by the order of the Local Government."

19 I think a water-rate should not be imposed on lands irrigable by a well, and the occupants should not be made to pay it as such. The nature of the land will be entirely changed by the construction of the well without incurring the least cost to the occupants; in other words, the area that was unirrigable at first would thus be turned into an area irrigable, and the rent on the land shall be consequently raised to the extent of that payable by irrigable land in case the maker of the well is not the agriculturist himself. The difference between these two rates of rent shall be added to the Government revenue after a deduction of the usual rate as a remuneration to the lambardar, who collects the sum from the tenants. This increment over and above the original Government revenue shall be payable to the party at whose cost the well has been constructed, whether it be a zemindar, a duly authorized company, or Government. In this case the settlement of matters connected with the occupants of the lands that are irrigable by the well does not present any difficulty.

20 The second way of effecting an improvement in the condition of land, by providing facilities in the way of irrigation, has not been referred to in any of the papers on land improvement or famine protection measures as far as I have seen them. The adoption of measures calculated to facilitate irrigation can, I suppose, do very much towards improving the condition of land and mitigating the severities of famine.

21. It must be admitted that to invent an easier and less expensive method of drawing out water from the wells than that now practised in India is almost impossible. There are, however, vast tracts of lands on the banks of rivers and canals only a few feet higher than the surface of the water, and others near which canals run but cannot irrigate their more elevated portions. There does not appear any great difficulty in raising a sufficient quantity of water to so small a height by means of a machinery. There do exist pumps capable of raising water in large quantities to so insignificant a height by means of steam. The cost of the application of such machinery will, I am of opinion, be very little when compared with the degree of the benefit received and with the income derivable by that means. Moreover, I suppose that on the banks of those rivers, canals, and streams whose waters flow with sufficient rapidity machines can be erected that may work by means of the current without incurring too much expenditure. This proposal, it seems to me, also deserves due consideration, and its adoption or rejection must depend on the result of a thorough investigation.

22. The experiment cannot be tried by the zemindars, but by Government or an association inclining to undertake the work. But the chief difficulty lies in the fact that, supposing any one wishes to form a company (as an attempt was made in the district of Aligarh some time ago), there exists no law allowing him to take such a step. Such an experiment will require that a suitable tract be chosen for irrigation; that a certain area be occupied either permanently or temporarily as the site for the erection of the machinery, and that the company be authorised to supply water to the adjoining lands, and to collect the water-rate.

23. There is no doubt that the success or failure of this undertaking will depend on the result of experiment, but no experiment can be tried when no law allowing such a step exists.

24. The third way of affecting an improvement in the condition of land, by maintaining or improving its productive powers, is one of those matters that deserve special consideration, and has, to a great degree, affected the condition of the ryot. It is indeed a fact that a perceptible decline in the productive powers of land has of late taken place in some parts of India. In other words, a slackness has taken place in endeavours to apply the productiveness of the earth to the best use, which may be attributed to the following causes:—

(a.) *The land does not receive a sufficient quantity of manure.*—The cultivated area has no doubt been greatly enlarged, and the manure has been more scarce than before. The explanation of this scarcity of manure may be sought in the high price to which wood, as a fuel, has reached, owing to the destruction of the forests and to large additions to cultivated tracts. Dung, which was formerly used more as a manure than as a fuel, is now more extensively devoted to the latter purpose, and the poor cultivators have consequently a greater inducement to sell it as a fuel than to keep it for the purposes of manure.

(b.) *The land is not ploughed a sufficient number of times.*—The weeds, as a consequence, grow in abundance with the crop, to the great injury of the latter, making the plants stunted and the corn ears thin. Though these weeds are cut from time to time, yet their roots remain in the ground and become the germ of new shoots.

(c.) *The crop is not sufficiently irrigated where there are wells, and the corn generally becomes thin.*

25. These two last-mentioned deficiencies may generally be attributed to the scarcity of oxen. Those that are kept by the cultivators want much in physical strength, so necessary for the purposes of agriculture. Cattle are now much fewer in numbers than formerly, and have consequently risen in price. The cost of breeding and maintaining cattle is also greatly increased in proportion to the decrease in the number of pastures on account of vast additions in cultivated area. All these facts deserve due attention on the part of those who are busy in contemplating remedies for the calamities of famine. It is high time that measures calculated to give popularity to artificial manure, and to provide facilities in the rearing of cattle, may be adopted. The adoption of these measures lies, not in the power of Government but in the hands of the people themselves, who ought to set on foot committees for the purpose, and Government to support their endeavours and further their designs as much as it can.

PART II.

26 Indebtedness and high rates of interest have reduced the cultivator to a wretched and grievous state. The fruit of all the favour accorded to him at the time of settlement, and of all the drudgery he is doomed to perform, is safely enjoyed by the money-lender, and still he is not able to extricate or relieve himself from indebtedness.

27. This state of things cannot, however, be attributed to unfairness or fraud on the part of the money-lenders, but various circumstances have combined to raise the rate of interest to so high a degree. The great demand for money, the necessity of obtaining loans occurring to all agriculturists simultaneously, and the bad security for the loan, tend to make the rate of interest very high. In former times the creditor was empowered to sit *dharna* at the door of his debtor, and to take possession of his moveable property, and of his fields and standing crops. All these proceedings were adopted in a legal way with the sanction and support of the headmen and the lambardars, and even of the amils (collectors), without even the ceremony of resorting to a court of justice. Such acts are now considered as offences, which a civilized and just Government ought to punish, and the money-lender has no other way of recovering his loan except by resorting to an action in a civil court. I mean to say that illegal force and severity, which was an easier way of recovering a loan, no longer exist. *Dharna* did not imply a mere sitting at the door of a debtor, but it intercepted all necessities of life from coming into the house, and prevented women from going out for natural calls.

The security of the loan has evidently become much less than before, and the risky nature of the business has much to do with the exorbitant rate of interest.

28 Whatever the cause may be, the fact is that cultivators have been greatly ruined on account of their indebtedness. The transaction now carried on between the cultivator and the money-lender takes one of the following forms:—

(a.) The supply of corn for the maintenance of the cultivator from harvest to harvest.

(b.) The supply of seed for a period intervening between the sowing and the reaping of a crop.

(c.) The sale of cattle to the cultivators on credit.

(d.) The loan of money for the purchase of cattle, for the payment of rent, or for other household business

29. The period for which a loan of corn is taken never exceeds six months; such loan is charged at 25 per cent of interest for that period, i.e.,¹ a loan of one maund of corn is to be repaid at the time of the next harvest by a maund and ten seers of the same sort of corn. This rate, though apparently 25 per cent., comes out about 20 per cent. when the difference of the prices of the corn at these two periods is taken into consideration. In case the loan is not repaid at the proper time, the interest is added to the principal, and the whole amount being regarded as the principal, is liable to be repaid at the same rate of interest at the next harvest; and the process is repeated at every failure of payment.

30. Though the terms of such an agreement are very stringent and to some degree immoral, yet they cannot be said to be fraudulent or unfair. The only unfairness on the part of the money-lender in these transactions is that the corn which he advances to the cultivator for his maintenance is generally of the worst quality, while that given for seed, though a little better than the former, is not quite suitable to the purpose; and hence the bad quality of the produce of his field.

31. The cattle which cultivators make over to the money-lender on account of their debts is generally sold to other cultivators on credit, who sustain much loss by this bargain, as they have had to pay highly for worthless animals by whose labours they cannot profit even for one season.

32. The cash money furnished for the purchase of cattle or for other household business is generally lent on an interest varying from Rs 3 to Rs. 3-2 per cent. per month, while that for the payment of rent is often lent on an interest of Rs. 6-4 per cent. per month. The latter does not, however, remain standing for a period longer than a month, as it is soon repaid by corn.

33. The cultivator suffers loss by taking a loan of cattle and cash in another way. He has no money at his disposal at the time of the harvest, and the money-lender must recover his debt by receiving corn or cattle from the cultivator at much lower price than it in reality is worth. It often happens that the whole produce of a cultivator's land is taken away by the money-lender as soon as the corn is reaped, threshed, and piled, leaving nothing for the maintenance of the *ryot* and his family. The *ryot*, thus deprived of the fruit of his labour, is compelled to resort anew to the money-lender for loan. The cultivator, as a rule, never plays false with his creditor, meets his engagements honestly, and regards himself as bound to pay the whole amount that comes off by the grinding process of compound interest. He is afraid that any failure on his part will incur the displeasure of the money-lender, result in the close of his transactions with him, and destroy his credit for ever. It is only when a second money-lender is ready to give loan to him that he ventures to object to the exorbitant demand of his creditors.

34. In villages where the wealthy landowner and cultivators are on amicable terms, the latter no doubt receive much help from the former. A Hindu zemindar, though not very mild in his transactions with his tenants, is far milder than a professional money-lender in respect of the interest he charges on his loan, and is less rigorous in the recovery of his loan. Rich Mahomedan zemindars may be divided into two classes; those who take interest on money publicly, and those who do so secretly. Both are very lenient in regard to the rate of interest. They generally agree to receive for the money they advance, corn at a certain rate at the time of the harvest, which is but a little cheaper than the ordinary bazaar rate. They do not, moreover, make much difficulty about giving a remission in the amount of interest at the settlement of the accounts.

35. It is a fact indeed that most of the zemindars in the North-Western Provinces did on the occasion of the late famine offer valuable assistance to their tenants. I can enumerate instances in which they not only postponed the recovery of the rents due from the tenants, but sold their jewels in order to provide corn and cattle to them. It is at the same time sad to admit that the zemindars invariably showed a repulsive coldness to cultivators with rights of occupancy, and that this class of cultivators was the one that suffered most in this general catastrophe.

¹ Letter from Officiating Secretary, Board of Revenue, to Officiating Secretary to Government, North-Western Provinces, dated the 22nd July 1876.

36. The existing courts are founded on the sublimest principles of justice, and therefore they are bound to respect all agreements and contracts entered into between parties voluntarily. They are bound to give a legal sanction to the amount due to a person and accept it as such. It is no part of their duty to use, or rather abuse, the authority vested in them by cancelling a legal debt merely because the debtor is a poor person. Such proceedings, if ever adopted, would prove more injurious to the debtor than to the creditor. A creditor when convinced of the invalidity of his debtor's engagements could not reasonably be expected to make such agreements any more.¹ If difficulties be placed in the way of recovery of a legal debt, they will be followed by difficulties in the way of borrowing money. The loser in all these cases will be the cultivator who is unable to carry on his business without money. It is not unusual, as I have more than once noticed, that where a case in which a creditor had undoubtedly the right to claim an amount of money lent to an agriculturist was dismissed on some legal point, the latter on resorting again to the money-lender added the dismissed debt also to the amount he now actually borrowed and gave a fresh bond for the whole. There are numerous transactions which have, according to law, been barred by limitation, but are notwithstanding regarded by the parties as valid, and dealt with as such. Explanation for this may be sought in the fact that the cultivator is anxious to keep his credit unsullied. He fears that if he once lost it, he will no more be able to carry on his business.

37. It is therefore evident that it is neither lawful nor just in a court to set aside a mutual agreement or annual authoritatively a legitimate claim simply because it is calculated to ruin a poor person. Such proceedings can only be justified in cases in which they are adopted to meet the ends of justice, and are not objected to by the creditor himself. This mode of administering justice is in conformity with the principles on which the insolvency law is based. One of the foremost principles of the law of insolvency is to divide the whole property of the debtor among his creditors in shares proportional to the debt of each, without interfering with their mutual agreements, and to exonerate the insolvent from further claims altogether. That a juster step could not have been taken by a court may be readily admitted by every one. An alteration in the principles of justice can therefore in no way prove beneficial to indigent agriculturists. To give a wider extension to the law of insolvency cannot of course be regarded as opposed to justice.

38. There does not exist any regular system on which the agriculturists may receive aid from Government for purposes for which they have recourse to loans from the money-lender. It may be admitted that there are a few districts in which such relief is given to agriculturists. But this scanty relief, provided as it is for a limited number of persons, and not necessarily at a time when it is most needed, cannot be expected to afford any material benefit to so large a community as the agriculturists are.

39. In the North-Western Provinces, or I should rather say, in all India, agriculturists are not in a state to admit of being relieved by such insufficient efforts as Government is now making to ameliorate their condition. Nor can these efforts mitigate the severities of famine. Effectual relief cannot be provided for the agriculturists by any measures short of the establishment of a distinct and separate department for the purpose in each district.

40. I would recommend the establishment of this new department in the shape of an agricultural bank, the interest on whose capital will, I believe, be sufficient to secure to the shareholders (whether they be Government or a company) a moderate profit after covering the necessary expenditure incurred in the establishment of it. The manner in which the agriculturists will obtain relief, and of which I intend to give a brief sketch in Part III, will be laid down in the bye-laws framed for the bank. If I am not mistaken, this is the only method by which the poor agriculturists may be rescued from

¹ Our courts of justice do of course protect rights, and the fact mentioned in this paragraph undoubtedly occurs. But the extinction of that personal power and force resorted to in the recovery of a loan which is mentioned in paragraph 27, and which brought about the recovery of money in an easier and more desired way, has given occasion to difficulty, expenditure, and delay in going through the formalities enjoined by our courts of justice for the recovery of a loan, and sometimes to disappointment; all of which tend to make a loan too much dear.

the severe grasp of the money-lenders, and relieved from the pressure of exorbitant demands.

41. The experiment of advancing money or providing cattle to cultivators or petty zemindars, for agricultural improvements or for the repayment of their debts, has been tried by Government, to some extent, in the districts of Allahabad, Banda, Moradabad, and Muttra. The observations which the Board of Revenue, North-Western Provinces, and the Government, North-Western Provinces and Oudh, have respectively made in reference to this experiment are cited below. The Board of Revenue observe that "as to the success of the experiment the Senior Member considers that it has hardly yet had a fair trial; that it is too soon to say whether the system is a success or not, but that when the reports for another year are received an opinion may be formed."

The Secretary to Government, North-Western Provinces, remarks that "the Lieutenant-Governor concurs with the Senior Member that it is too soon to say whether the scheme is a success or not; but looking to the fact that tenants who have received advances have punctually paid up their instalments, that an eagerness to take up advances has been exhibited, and that it has not been found that solvent tenants lose credit with the village *bania*, simply because they have preferred the advantages of a Government loan, his Honour thinks that the operations, so far, have been very encouraging." The above remarks, however imperfect, favour the proposal of the establishment of agricultural banks. One of the greatest advantages consequent on the establishment of such banks will be that money-lenders will necessarily lower their rates, and the cause of the cultivators' grievance, the exaction of high rates of interest by the money-lenders, will be removed without difficulty. Those cultivators who will still like to continue their relations with their own money-lender unbroken may well be able to do so under such circumstances.

PART III

42. The want of providing means for the improvement of land and relief to agriculturists is felt in each district in such a degree that I fear Government is unable to meet it in any ordinary way from public revenues. To meet this end Government must contract a loan, or devise some other method more acceptable than may answer the same purpose. This method may be said to be the setting on foot of limited companies, raising funds for purposes of agricultural improvements, while Government may become one of the partners.

43. These companies may respectively be named—

- (1.) *Agriculturists' relief banks*, which should be established in each district separately. An allusion to the establishment of such a bank was made by the Hon'ble Sir John Strachey, in 1876, when he was the Lieutenant-Governor of the North-Western Provinces.
- (2.) *Land improvement banks*.
- (3.) *Land improvement companies*.

44. Agriculturists' relief banks may be established for the following purposes:—

- (a.) To lend money to agriculturists—
 - (i.) for purchasing seed, cattle, ploughs, and other agricultural implements for the cultivation of land or sowing of crops;
 - (ii.) for the subsistence of tenants, their families, and such collateral relatives as share in the cultivation of the holding of such tenants.
- (b.) To provide for sale to tenants, corn, cattle, ploughs, and other agricultural implements for the purposes specified in clause (a) of this section.

45. Land improvement banks would advance money to tenants or landlords for the following purposes:—

- (a.) For the construction of wells, tanks, and other works for the storage, supply, or distribution of water for agricultural purposes.
- (b.) For the preparation of land for irrigation.
- (c.) For the construction of works—
 - (i.) for the drainage of land;

- (ii) for the reclaiming of land from rivers or from other waters;
- (iii) for the protection of land from rivers or from other waters;
- (iv) for the protection of land from floods or from erosion or other damage by water.
- (d.) For the reclaiming, clearing, or enclosing of lands for agricultural purposes.
- (e.) For the renewal or reconstruction of any of the works mentioned in this clause, or alterations therein, or additions thereto.
- (f.) For the construction of works necessary for the purposes specified in this section.

46. Land improvement companies would be constituted to accomplish the purposes specified below with their own capital.

- (a.) Construction of wells and tanks for agricultural purposes.
- (b.) Construction of a canal or aqueduct with the object of irrigating a field from a river, stream, canal, or tank.
- (c.) Construction of works for the storage of water at a convenient place with the object of devoting it to the irrigation of a certain field or fields by means of a canal or aqueduct.
- (d.) Erection of machinery on the banks of a river, stream, canal, or tank, to convey water to more elevated tracts.

47. All these companies should be regulated by the law relating to the formation of limited companies, and the capital with which each company is to start should be divided into a number of shares. Every one would be at liberty to purchase any number of shares, and Government would be required to purchase a certain number of them.

48. Besides the special establishment for an agriculturists' relief bank, including the appointment of trustworthy *mahajans* as agents in principal places, the *tahsildár*, the *peshkár*, the *kánungo*, the *tahsildár* of the *tahsil*, the *patwári* of each village, and the *kharánci* of the district shall be held as officials of the bank.

A deputy collector or deputy collectors shall be specially nominated by Government for exercising general superintendence and discharging other duties connected with the interests of the bank, Government being authorized to pay the whole or part of such deputy collector's or deputy collectors' salary out of the income of the bank.

49. At the end of each season, the deputy collector on special duty, or the *tahsildár*, *peshkár*, or *kánungo* shall, with the assistance of the *patwári*, make out a list of all the agriculturists, in order to ascertain which of them ought to receive loans.

The said list shall contain the following points:—

- (1.) Whether the agriculturist is a zemindar who farms his own land; the area of his holding.
- (2.) Whether he is a tenant with rights of occupancy, and with or without power to transfer such rights.
- (3.) Whether he is a tenant without the rights of occupancy.
- (4.) Whether he has got any sub-tenant.
- (5.) Area of the land he cultivates.
- (6.) Description of the land.
- (7.) Amount of the rent he pays.
- (8.) Number of cattle or other implements of husbandry in his possession.
- (9.) Description of the loan he wants to take—
 - (a.) Seed, with its kind, quantity, and estimated cost.
 - (b.) Cattle, with its number and estimated cost.
 - (c.) Implements of husbandry, with their number and estimated cost.
 - (d.) Corn for food, with its kind, quantity, and estimated cost.
 - (e.) Time at which these things will be required.
 - (f.) Cash money, with its amount and the purpose for which it is required.
- (10.) Amount of the debt he owes.
- (11.) His character as a good tenant.
- (12.) The statement whether the zemindar consents to become surety for the loan granted to a tenant, and whether the tenant likes to take the loan in this manner.

50. The deputy collector on special duty shall, with the assistance of the *tahsildár* and others, ascertain the accuracy of these lists, make proper modifications in

¹ Letter from Officiating Secretary, Board of Revenue, to Secretary to Government, North-Western Provinces and Oudh, No. 37—IV. B. 21, dated the 23rd January 1878.

² Letter from Secretary to Government, North-Western Provinces and Oudh, to Officiating Secretary, Board of Revenue, North-Western Provinces, No. 588A, dated the 2nd March 1878.

¹ Rules for lending money to cultivators and small zemindars at moderate interest for agricultural purposes, framed by the Board of Revenue, North-Western Provinces, in July 1876—Rules 2 and 3.

the amount of the loans applied for by the agriculturists, fix the amount of credit to be given to each agriculturist with reference to his circumstances generally,¹ and reject those who are found to have applied for loans without needing them.

51. The debts due by the tenants to whom it may be decided to grant loans will be ascertained, and their accounts with the *mahájans* will be made up and paid off by the bank, and further loans will be granted to them from time to time, provided—

- (1.) That each of them agrees to sign a bond to the effect that he has placed his *zemindari* or tenancy interests (as the case may be) at the disposal of the bank, and has no more right of transferring the same interests or pledging them in any debt as long as he remains a debtor of the bank;
- (2.) That he has no right of transferring, without the permission of the bank, any of the cattle or other implements of husbandry taken from the bank, as long as that loan or part of that loan remains due;
- (3.) That he shall never appropriate to himself, without the permission of the bank, any part of the produce of the crop raised by a loan contracted from the bank as long as the rent or the loan payable to the bank remains wholly or partially due.

52. The cattle given by the bank or purchased by the money advanced by the bank will be branded², and in case a permission for parting with the cattle is obtained, it will be branded a second time.

53. The Board of Revenue, North-Western Provinces, have laid down (Rule 3) in their "*rules for lending money to cultivators and small zemindars at moderate interest for agricultural purposes*," drawn up in July, 1876, that "such persons as are found to owe more money than the scale of credit drawn up under Rule 2 would justify will be rejected as insolvent." I do not concur with this opinion, and am inclined to think that no tenant should be rejected on this ground.

54. An Insolvency Act will of course be required for such tenants, in accordance with which they shall have to apply for being declared insolvents. The insolvency court shall ascertain all debts, determine the amount due to each creditor, and fix the value of the debtor's property. The bank shall then distribute the amount of the value thus determined among the creditors in proportion to the debt due to each, and discharge the insolvent from further liabilities. The holding of the debtor will be held to be the property of the bank, who will then make it over to the tenant and recover their money as if it were a loan advanced to the tenant. The property thus made over to the tenant will be held to be the security of the advances made to him.

55. The bank will be at liberty to furnish a tenant with any of the things mentioned under the heads (a), (b), (c), and (d) of clause 9, section 49, instead of money for their purchase, or make over the amount to some other trustworthy person to purchase the things required by the tenant.

56. It will be incumbent on the bank to provide the money, corn, or other articles to a tenant at the time when they are required and at the village where the tenant resides, or at a neighbouring town, bazar, or mart, where people generally resort to exchange commodities.

57. The tenants shall have to give receipts for things thus furnished to them, and proper officials or other reliable persons shall be appointed to testify to the transactions, and affixing their own signatures to the receipts, shall make them over to the proper authorities. The presence of the *patwári*, who shall likewise attest the receipts and make a note of all transactions in his diary, will be indispensable.

58. There will be many cultivators to whom advances may be made by the *zemindar* binding himself as a surety for their repayment. In this case the above rules will be considered as suspended, the *zemindar* shall be required to sign a regular surety-bond, and the amount shall be recoverable according to the terms of such bond.

59. As far as I know from experience I am convinced, as is also maintained by the Board of Revenue, North-Western Provinces,³ that the tenant "is not wilfully

dishonest as a rule." He is always punctual in his dealings, and tries to meet his engagements, however rigorous and unreasonable they may be. His failures arise from pure inability to pay. I have therefore much reason to believe that the bank money will be very little exposed to risk in their transactions with agriculturists.

60. Interest will be charged on the loans thus advanced to agriculturists, the rate of which will be fixed by Government from time to time. A payment made by the agriculturist will, first, be credited to the account of the interest due by him up to date, and the balance, if any, will go to discharge the principal. The interest will always be charged on the balance of the principal standing due, without ever resorting to the process of compound interest.

61. The proceedings of a land improvement bank will admit of no great difficulty. They will to a great extent conform to the provisions of the Land Improvement Act of 1871. Some facilities shall, however, have to be provided in the rules relative to the making of advances.

There is no doubt that this bank presents but little prospect of success, as it will also have to encounter the difficulties that lie in the way of a satisfactory working of the Land Improvement Act of 1871.

62. The land improvement company can of course carry on its business on a large scale, and can give it an extension in proportion to the capital it possesses.

Such a company would have to select tracts fit for the purposes it has in view. Previous to the construction of wells or tanks it would ascertain the sites most suited for their construction, for the purposes of irrigation, the cost of well sinking in each place, their degree of usefulness, the area protected by them, and the profit derivable from them.

It would likewise ascertain whether the local rivers, streams, or canals can be available for such purposes; and if so, what they would cost, and what advantage can be derived from them.⁴ It would similarly select places suited for the construction of dams.

To irrigate lands by the aid of machinery is indeed a hazardous undertaking, but the company would easily be able to try the experiment if it saw some chance of success in it.

63. The co-operation of the district officers will be indispensable for the success of the company's undertakings. All plans will be executed in consultation with the collector of the district, and the reports made by the company will be forwarded to Government through the commissioner of the division. The opening of the works recommended or their postponement will depend on the orders received from Government.

64. The collector of the district will always be the president of all the banks thus established, and the funds will be deposited in the district treasury.

65. These banks should be allowed the privilege of having their loans recovered in the same way as is laid down for the recovery of the advances of money made by Government, with this difference only, that the banks will not be competent to adopt any measures on their own account, but shall make up their accounts and present them with an application to the collector of the district, who will adopt the usual measures for their recovery.

66. As there exists no difference between the advances made by Government and those made by these banks, and as these banks will be subject to the supervision and control of the collector of each district, and will afford no ground of suspicion as to the correctness of their accounts, it will be no injustice to make an exception in their favour by excluding them from the process of court enquiries. This is the principle observed by Government in regard to the recovery of its own arrears of land revenue and advances. To extend this rule to the case of advances made by the banks will not present just grounds for objection.

67. The irrigation works constructed by the company will principally be of two descriptions, wells or canals. In case of the former there will occur no difficulty as to the remuneration to which the company will be entitled,

¹ Rules framed by the Board of Revenue, North-Western Provinces, in July 1876—Rule 2.

² Rules framed by the Board of Revenue, North-Western Provinces, in July 1876—Rule 5, clause (a).

³ No. 755N. IV., dated the 22nd July 1876.

⁴ If I remember rightly, there have been constructed two local canals of this sort in the district of Bijnor. In 1855 I perused the papers connected with these canals with the object of compiling a history of that district (which had been completed, but lost in the mutiny), and recollect that the profit derived by one of the canals was soon able to cover the costs of its construction with interest, and the other also supplied a moderate rate of interest. On these grounds I feel persuaded that there must be other districts presenting us fair a chance for such local works for irrigation.

as is mentioned in section 19. The case of the canals thus constructed is liable to involve some difficulty. Government would, of course, have to prescribe and impose a water-rate on the lands irrigated by them. The necessity of compelling the cultivators to irrigate their lands by the canal water, and pay the water-rate, will most probably never occur, as a willingness has decidedly been evinced by the people to profit by the local canals running in the district of Bijnor, and pay the water-rate.

68. There may at first occur some difficulty in securing a sufficient number of subscribers for these companies' shares, and Government may be obliged to take a rather large number of shares, yet I have every reason to believe that these banks will soon become highly popular, and subscribers will come forward in larger numbers than are wanted. For the chances of money-lenders of investing their money in usury without joining these banks will be greatly diminished, while the banks will have an increased facility in the recovery of their loans, and very little risk. Moreover, the rate of interest on private loans advanced to agriculturists will be much reduced by the establishment of these banks, while the difficulties of their recovery and the risks attending them will remain as usual. If, however, the privilege alluded to in section 65 is not accorded to the banks people will hardly be persuaded to subscribe for their shares.

PART IV.

69. It will be of no use to make any observations on famine, as numerous investigations have already been held on that point; but I deem it proper to make a few remarks as to the effect which the proposal under contemplation will have on mitigating the severities of famine.

70. The relief provided in a famine is generally confined to two forms, the establishment of poor-houses, or the opening of public or relief works. In either of these cases it is practically impossible to make arrangements by which the cultivators should not be drawn out from their homes. Their separation from home tells seriously on them. All their household articles, however worthless or insignificant they may be, are destroyed for want of care; their habitations are almost dismantled, their cattle lost, and they are themselves much emaciated before they leave their homes. When they return to their homes after the calamity is over, they have to furnish all these things anew, and contract loans for the purpose, for they have no other way of re-establishing themselves. Any measure calculated to relieve these poor creatures without compelling them to leave their homes may probably prove most beneficial to them.

71. Section 49 provides that an agriculturists' relief bank should prepare a list of all the cultivators of a

village at the close of each harvest; and it will be an easy thing for Government to entrust the bank at the time of a famine with a certain amount of money intended for the relief of the poor cultivators. The bank will be able to furnish corn to the cultivators for their subsistence without removing them from their homes. Such relief will not, however, be regarded as a loan, but simply an act of charity.

72. The greatest calamity experienced by cultivators in the days of famine is the loss of their cattle. This bank may well be able to adopt measures for the protection of the cattle by applying to Government for the preservation of certain areas in various forests as pastures that may be capable of protecting cattle in time of drought. Every cultivator will be at liberty to place his cattle (at his own risk of course) under the charge of the bank, who will send it over to the pasture appointed for the purpose, and will, as soon as the calamity is over, have the cattle got back and made over to the owner. The cost incurred by the bank in these arrangements shall be defrayed by Government from the famine relief fund. Any measure conducing to the preservation of the cultivators' cattle in the days of drought is, in my opinion, one of the most substantial forms of relief.

PART V.

73. In order to give effect to these proposals it will be necessary to amend the existing laws so as to secure the following provisions.—

- (a) To entitle every class of cultivators to establish means of irrigation in their holdings in case the zemindar refuses to do so.
- (b.) To entitle them to rights of occupancy after the means of irrigation have been thus established.
- (c.) To entitle such cultivators to compensation in case they are ousted by the zemindar, as is the case in Oudh and the Punjab.
- (d.) To legalize the pledging of such rights in the bank loans.

74. In addition to the above-mentioned amendments the following special laws shall have to be enacted to meet the object of these proposals:—

- (a.) A law relating to the insolvency of agriculturists.
- (b.) An Act validating the establishment of the agriculturists' relief banks.
- (c.) An Act validating the establishment of the land improvement banks.
- (d.) An Act validating the establishment of the land improvement companies.

STUD AMED.

Simla,
9th September 1879. }

XII.—RAILWAY ORGANIZATION.

NOTES ON RAILWAYS AND RAILWAY WORKING IN CONNECTION WITH FAMINE TRAFFIC BY
CAPTAIN BISSET, R.E.

THE following is a brief list of the subjects alluded to:—

1. Extended and improved mercantile relations from rail and telegraph.
2. Extended area from which food-supply available.
3. Rates of carriage by rail and cart.
4. Difficulties about despatch of goods, bribery, &c.
5. Diminution of difficulties as railway and road communication improves. Despatch more uniform, and not limited to fine weather.
6. Provision of shelter-sheds for accumulations of grain in times of heavy traffic.
7. Registration of goods.
8. Registration of goods by classes, and effects of—
9. Precedence given to high-class goods.
10. Precedence of grain in times of famine.
11. Regularity and punctuality of delivery in Bengal in 1874.
12. Regularity and punctuality of delivery in Madras in 1877.
13. Sufficiency of engine-power and of engine-drivers.
14. Sufficiency of rolling-stock.
15. Need for a uniform system of train-working, and evil effects in times of pressure of the centralized working.
16. Central control, however, of traffic¹ so as to maintain regular train-service
17. Necessity for agreement in times of pressure about the quantity of traffic to be interchanged at railway junctions.
18. Equitable arrangement about interchange of rolling-stock in such times.
19. Reduction of rates at Government expense, &c.
20. Carrying powers of each railway as limited by—
21. Capacity of line.
22. Equipment of engine and rolling-stock.
23. Effect of doubling lines.

Wider mercantile relations from extension of railways.

The extension of railways, and the connection of the trunk lines, has so increased the rapidity of communication that mercantile relations now subsist between the Native traders of all parts of India, and these traders

keep themselves well posted up in the state of the most distant markets, being keenly alive to the advantage of the telegraphic communication which has accompanied, where it did not precede, railways

The combined effect of Railway and Telegraph extension throughout the length and breadth of India, has permitted Government to rely upon the activity of private trade for the supply of food to all districts immediately served by railways.

Moreover, the area from which food-supplies can be drawn has been extended from the limit of 100 miles, which, with cart-carriage, in a famine-stricken country, destitute of fodder for cattle, or even with pack-bullocks or cooly labour, is a maximum to a range of over 2,000 miles.

Extended area from which supplies can be drawn.

For instance, during the recent distress in Madras, Bangalore imported some grain from Loodiana, which is 2,340 miles away.

The rate of carriage by cart is seldom less than 3 annas a ton a mile, or $\frac{1}{12}$ th of a rupee per maund per mile in ordinary times, when fodder is abundant, and prices as cheap as they usually are in Northern India; and this rate rises, in a country suffering from drought, to from $\frac{1}{10}$ th to $\frac{1}{8}$ th of a rupee, and it is in evidence¹ that even the latter rate is not profitable in such times

Rates of carriage by cart.

It will be a safe assumption, then, if, in a country suffering from drought, the rate for carriage by cart is put at $\frac{1}{10}$ th of a rupee per maund per mile.

4 annas 3 pie to 6 annas per ton per mile.

Taking an extreme case, where carts have to convey as part of their load, food for man and beast on their journey, the limit in miles to which cart-carriage can be usefully employed is probably about 100 miles; for in this distance the food would be one-third of the total load.

In more favourable circumstances, supposing fodder available on payment, the distance from which supplies could be drawn by cart would be considerably extended.

With carriage costing $\frac{1}{10}$ th of a rupee per maund per mile, and with a margin of 17 per cent. to cover agency and profit, the distance is shown below for the several prices at source of supply:—

PRICE AT SOURCE OF SUPPLY IN SEERS PER RUPEE.

	10	11 $\frac{1}{2}$	13 $\frac{1}{2}$	16	20	23	25	32	40
	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.
(a) When prices are 6 seers per rupee	80	125	168	200	248	272	280	308	328
(b) " " 8 " "	15	60	100	140	180	200	212	240	260
(c) " " 10 " "	—	—	30	70	112	132	144	172	192
(d) " " 13 " "	—	—	—	40	60	76	104	124	144
(e) " " 20 " "	—	—	—	—	—	7	36	56	—

Rates for carriage of grain by rail.

The above table does not, however, truly represent the possibilities of cart transport for short loads, as a smaller margin of profit would be sufficient.

The rates quoted by the railways of India vary from $\frac{1}{10}$ th of a pie per maund per mile to $\frac{1}{4}$ th and $\frac{1}{3}$ th, or from $\frac{1}{10}$ th to $\frac{1}{8}$ th and $\frac{1}{6}$ th of a rupee. There are lower rates in force on the East Indian Railway for long distances; and in the Bengal famine in 1874, grain for the distressed districts was carried by all railways at a rate of $\frac{1}{10}$ th pie or $\frac{1}{100}$ th of a rupee per maund per mile; the difference between this and the ordinary rate being paid by Government. A special rate applicable for September and October 1878 has just been advertized for edible grain and seeds, on the East Indian Railway from Cawnpore, and stations above it to Howrah, viz., 15 pie per 100 mannds, or $\frac{1}{133}$ th of a rupee per maund per mile.

These current rates of $\frac{1}{10}$ th, $\frac{1}{8}$ th, $\frac{1}{6}$ th, and $\frac{1}{4}$ th pie per maund per mile give rates of carriage—

- $\frac{1}{10}$ th pie = $\frac{1}{100}$ th of a rupee.
- $\frac{1}{8}$ th " = $\frac{1}{80}$ th " "
- $\frac{1}{6}$ th " = $\frac{1}{60}$ th " "
- $\frac{1}{4}$ th " = $\frac{1}{40}$ th " "

¹ Allotment of wagons, &c.

and it would be safe, taking all lines of railway together, to put the average rate of grain-carriage by rail at $\frac{1}{50}$ th of a rupee per maund per mile.

If it were asked, from what distance food-supplies can be drawn by railways at the above rate, the tables already given for cart-carriage can be referred to. With the same margin of profit, the distances from which supplies can be drawn are ten times those for cart-carriage.

It will be seen that taking 8 seers per rupee as a famine price, and 20 seers per rupee as the ordinary price in Upper India, grain can be sent with profit for 1,800 miles, or practically all over India.

I have seen some consignments of grain and pulses delivered at Bangalore from Loodiana in the Punjab, a distance of 2,340 miles, and I saw many such consignments delivered at Bellary, Gooty, and other stations in Northern Madras from Loodiana and other stations in the Punjab.

The following table shows the distances to which grain can be carried by rail from one district to another:—

¹ Memorandum by C. Bernard, Esq., on grain transport in Madras, dated 24th February 1877, paragraphs 11 to 13.

If at the centre of want, grain is assumed to be selling at the rates of 1, 2, 3, 4, 5, and 6 rupees per maund of 82½ lbs., then for an average rate of carriage of ½ of a rupee per maund per mile, and with a factor of profit of .85, the following table will show the distances to which grain can be carried:—

TABLE SHOWING THE PRICE IN RUPEES OF A MAUND OF GRAIN AT THE SOURCE OF SUPPLY.

		At a distance of miles.	SELLING PRICE IN RUPEES PER MAUND AT CENTRE OF WANT.					
			Rupee 1.	Rupees 2	Rupees 3.	Rupees 4.	Rupees 5.	Rupees 6.
Factor for profit = .85 Rate of carriage by rail = $\frac{1}{10}$		50	0.79	1.64	2.49	3.34	4.19	5.04
		100	0.72	1.57	2.42	3.27	4.12	4.97
		150	0.66	1.51	2.36	3.21	4.06	4.91
		200	0.60	1.45	2.30	3.15	4.00	4.85
		250	0.54	1.39	2.24	3.09	3.94	4.79
		300	0.48	1.33	2.18	3.03	3.88	4.73
		400	0.35	1.20	2.05	2.90	3.75	4.60
		500	0.22	1.07	1.92	2.77	3.62	4.47
		600	0.10	0.95	1.80	2.65	3.50	4.35
		700	—	0.82	1.67	2.52	3.37	4.22
		800	—	0.70	1.55	2.40	3.25	4.10
		900	—	0.57	1.42	2.27	3.12	3.97
		1,000	—	0.45	1.30	2.15	3.00	3.85
		1,200	—	0.20	1.05	1.90	2.75	3.60
		1,400	—	—	0.80	1.65	2.50	3.35
		1,600	—	—	0.55	1.40	2.25	3.10
		1,800	—	—	0.30	1.15	2.00	2.85
		2,000	—	—	0.05	0.90	1.75	2.60
		2,200	—	—	—	0.65	1.50	2.35
		2,400	—	—	—	0.40	1.25	2.10
		2,600	—	—	—	0.15	1.00	1.85
		2,800	—	—	—	—	0.75	1.60
		3,000	—	—	—	—	0.50	1.35
		3,200	—	—	—	—	0.25	1.10
		3,400	—	—	—	—	—	0.85
		3,600	—	—	—	—	—	0.60
		4,000	—	—	—	—	—	0.10
Cost per maund in rupees.	No. of seers to be bought for a rupee.							
0.50	80							
0.75	53.3							
1.00	40							
1.25	32							
1.50	26.6							
1.60	25							
1.70	23.5							
1.80	22.2							
1.90	21							
2.00	20							
2.20	18.2							
2.40	16.6							
2.60	15.4							
2.80	14.2							
3.0	13.3							
3.50	11.4							
4.00	10							
5.00	8							
6.00	6.6							

NOTE.—The Table will best be understood from the following example—
If the selling price at the centre of want is 4 rupees per maund, grain can be profitably moved for 1,000 miles from a source of supply where the price is Rs. 2 15 per maund, or 19 seers per rupee; or from 1,600 miles from a source of supply where the price is Rs. 1.10 per maund, or 28 seers per rupee.

Despatch of goods.

The Native trader takes full advantage of the telegraph and of the railways, and, as he ordinarily buys his grain at lower rates than those quoted in the *Government Gazette* as current, his profits are much greater than would at first sight appear. And as certainly as a strong demand arises for grain or other country produce, either for a famine district or for export, the railway stations of all districts from which export is possible, are crowded with stores of grain, while the railway officials are besieged by applicants for early despatch of their consignments. These are the times when the railway staff are tempted with money to secure undue preference, or when, from the narrowness of their incomes, or even otherwise under insufficient supervision, they are tempted to demand bribes before despatching goods. And if the railway stations are kept open to all comers, every available yard of ground is covered with produce within a very few days after the demand has arisen; and this occurs, not at one station, but at every railway station in the producing districts.

Bribery.

Accumulations at stations.

Regular receipt and despatch of goods in time of pressure. Registration.

There are very great difficulties in arranging for the receipt and regular despatch of goods under such circumstances, and these difficulties have never yet been met in an altogether satisfactory way.

Most railways have adopted a system of registration, sometimes of goods not actually deposited in the goods yard, but sometimes, and perhaps more frequently (at all events with the smaller traders), only of goods actually deposited in the yard. Limiting entry in the register to goods deposited in the yard, is probably the better plan. But it involves exposure of goods to the weather, and frequently entails great loss from rain.

On the other hand, if goods are not actually deposited before registration, any unscrupulous trader can register large supposititious consignments, and then sell to the highest bidder such wagons as are allotted to him. This is, in fact, a very common occurrence in times of excessive traffic.

Shelter-sheds.

It might be supposed that sheds could be provided to shelter the vast quantities of grain which are deposited in such circumstances at or near railway stations.

The vast area of shelter required, makes this all but impracticable: 10,000 tons of grain piled six feet high, with the necessary passages and divisions, cover an

area of 100,000 superficial feet, and such an accumulation is by no means an uncommon one. And the Railway Companies urge, not without some reason, that their duties as carriers does not include the warehousing of goods.

But the commercial success of the shed-building enterprise of the Nagpore Municipality in 1877, might be quoted as an example to other cities, and to large traders; and the co-operation of the Railway Companies might be invited in the construction of sidings serving such sheds or godowns, just in the same way as in England railway sidings are laid to collieries, coal depots, and large warehouses.

Some railways register goods in classes, and despatch the higher-class goods in preference to the lower class.

As an instance, I quote from a report by Captain Bisset, R.E., see No. 40-41, from Secretary to Sir R. Temple, 27th January 1877:—

“The allotment of wagons during a recent period of six days, was—

“ 525 for cotton,
“ 136 for linseed,
“ 153 for grain,

“Total 814 wagons from Nagpore district.”

In registering goods for despatch, priority of registration does not thus secure priority of despatch, independently of the class of goods.

It should be mentioned that the instance cited above occurred during the period when so many wagons for the Madras Railway, and for Poona and Sholapore, were left standing still at Kurjnt on the Great Indian Peninsula Railway; but the principle has been asserted as a general one.

This precedence of high-class goods limits the benefits of registration to each class of goods. For a consignment of cotton can thus take precedence of a consignment of linseed, precedence of one of grain consigned weeks or even months earlier.

Such precedence of high-class goods is probably in accordance with the general wish of the mercantile community to whom the delivery of high-priced goods is of more importance than that of the cheaper produce. But it certainly places large dealers in grain at a serious disadvantage in districts like Nagpore, where

Provision of shelter-sheds by municipalities or by large traders.

Registration of goods by classes.

cotton, linseed, and grain are all largely grown. They can never depend upon getting their grain to the port in time.

From conversation on this subject with railway officers and merchants, I believe that the paramount necessity of the supply of grain to famine districts is fully recognised; and that, although outcry was raised at orders issued last autumn about the supply of a specified daily number of grain wagons to Madras and Hyderabad, this outcry was raised more by the fancied attempt to direct the course of private trade, and to force that number of grain wagons towards the distressed countries, than by any objection to letting those districts get all the grain which the traders offered for transport thither.

I would certainly give consignments of food-grain precedence in times of famine, as far as traders offered them. The traders would not overstock the markets.

Working of
railways in
Bengal
in 1874.

Regularity of despatch and punctuality in the delivery of goods, were, on the whole, well maintained throughout the pressure in Bengal in 1874; though, even there, casual delays to trains arose from deficiency in power of some of the engines, and from other causes.

The inefficiency of the numbers and the high efficiency of the staff, their being accustomed to yearly seasons of busy traffic, the comparatively large engine and rolling-stock of the East Indian Railway, and the conditions of the line with its easy and fairly uniform gradients, favoured this result. Trains started at one end, and were delivered without detention or breaking up at their destination. And the result was that no excessive delay occurred in the arrival of goods. A reasonable interval between despatch and arrival was the rule.

A great help to this result was the central control (of the Traffic Manager) over the allocation of empty wagons, which was exercised so as to provide full loads, and no more than full loads, for each possible train on each district daily; and the distribution of engine-power was adjusted accordingly, so that a train, once set in motion, was kept moving on to its destination.

Interchange
at junctions.

Some controversy arose about the number of wagons which should be accepted daily at the junctions, with the Sind, Punjab and Delhi Railway at Gazecabad; and while this lasted, there was considerable inconvenience to consignors, and obstruction at the junction-station, as well as irregularity in the despatches. The difficulty was mainly, that the East Indian Railway Company, while using the Sind, Punjab and Delhi Railway Company's wagons on their own line, did not give any empty wagons of their own to help to carry the through traffic from the Punjab line. And it was settled by an agreement of the East Indian Railway Company to hand over as many of their own empty wagons daily, as would, when combined with all the wagons the Sind, Punjab and Delhi Railway could spare for this service, provide a through service to the distressed districts of the number of loaded wagons a day which was agreed upon as reasonable; and this settlement was loyally adhered to with the best results. The considerations which guided the decision were complicated, but the first was the maximum delivery to the centre of distress, which was, under the circumstances, accepted as over-riding all others. But the point to be noticed is, that such an agreement is necessary to full working, and that any agreement is better than none.

As an evidence of the advantage of such an agreement, and of making arrangements for working up to such agreement, it may be mentioned that a Traffic Manager, who was decidedly opposed to any such measure in the early months of the heavy grain traffic of 1877, made agreements of the nature suggested during the subsequent months.

These agreements cannot be made beforehand, and they should be subject to revision from time to time. They should be made at a Conference, at which independent members, with a voice in the decision, in addition to the members representing the railways interested, should be present.

Working of
railways
during
Madras
famine
of 1877.

In the Madras famine of 1877, excessive delay in the delivery of goods was common. Grain was sent from long distances, and passed over several systems of railways. To grain carried in foreign wagons over the Great Indian Peninsula Railway, there was no unreasonable delay, the wish to avoid demurrage charges operating to prevent detention.

But grain consigned from Great Indian Peninsula Railway stations (and transhipped from the Holkar State Railway at Khandwa), reached its destination after very irregular periods on the road.

Wagons were loaded up in excess of the engine-power, and, on arrival at the last station of a district, had

there, and at the end of each successive district, to wait their turn for train room. In fact, for some time the line appeared to be worked by districts rather than as a whole. Changes of gradients were frequent, leading to the breaking up of train-loads, and to irregularity in the delivery of consignments. And the distribution of engine power was difficult, and was not always successfully made. Moreover, the number of engines was insufficient, both on the Great Indian Peninsula Railway, and on the Madras Railway. Many of the engines were not capable of working up to full-pressure, and it was not an uncommon occurrence for trains to be brought to a stand between stations while the engines got up steam.

Want of
central
control of
wagon
allocations.

Distribution
of engines.
Deficient
numbers of
engines.
Working
pressure of
engines and
stoppage of
trains
between
stations.

Train-
robberies.

Such stoppages gave the opportunities for train robbery, which were so freely taken advantage of; and their occurrence was made a screen for further irregularities.

The difficulties already alluded to, about the amount of traffic to be transferred at junctions, arose in 1877, both at Jubbulpore and at Raichore; and these difficulties, in connection with differences of opinion about rates to be paid for wagon-mileage, threatened at one time to lead to an absolute suspension of through traffic.

Interchange
of traffic at
junctions.

In times of heavy traffic, disorganization sets in, unless the system of train-working is efficient and not central. Objection is made that station-masters cannot safely be trusted to give line clear to trains. The Native station-masters on many lines of railway in India, are not found unworthy of such responsibility, and the proper remedy is to get station-masters who can be trusted, and more of them, so as not to overwork them.

Train-
working.

An extract from a note on the working of the trains on the Madras Railway in 1877 is here quoted:—

Extract from Memorandum on the progress of the arrangements of improving the delivery of grain from the North to the Madras Railway.

"VIII.—Reference has already been made to the system under which the movements of the trains on the Madras Railway are regulated, as one of the main causes of the irregularity. The system works very well with few trains, whose irregularities are easily adjusted; but with the multiplication of trains, telegraphic references to, and replies from, the directing officer increase proportionally, the telegraphic communication fails in the promptitude necessary to prevent serious delays, and, in consequence of these delays (which have always a tendency to become cumulative), the train service gets disorganized.

"This disorganization throws an incessant strain on the directing officer. But its consequences are perhaps most severely felt by the train staff, whose working-hours are extended to the full limit of endurance.

"A change (involving some delay and considerable expense) to the block system is now being made between Raichore and Adoni; but it will not be practicable, even if it is desirable, to introduce this change over the whole line, in time to be of present use. I believe that change to the system in force on most of the other Indian Railways might safely be introduced, length by length, with a few days of special attention by the telegraph and traffic officers to each length as the change is made.

"But if this is considered impracticable, I believe that, even with the present system, an increase to the telegraph staff would afford considerable relief; and I am confident that if the necessary signallers are not available in this Presidency, they could be obtained from other parts of India."

The trains must not be overloaded, and want of punctuality in arrival should be punished, instead of being at a premium, as it is on some railways, by large payments of overtime.

In India, where the supply of trained engine-drivers and other railway staff is limited, the economy of their working hours by regularity of train-working is of the highest importance.

Economy of
time of
engine-
men, &c.

There should be as much as is possible uniformity of speed of all trains, and avoidance of special trains. The latter take more than their own train room, for they disturb the regular working, and cause detention to other trains.

Uniformity
of speed and
avoidance of
special
trains.

The water-supply should be abundant, and the tanks big enough.

Water-
supply.

All long station intervals should be divided by crossing-stations, as has already been done on many railways.

Crossing-
stations.

Adherence
to standard
dimensions.

The rigid adherence to standard maximum dimensions of rolling-stock, and similarly to the minimum distance of fixed structures, are matters of absolute necessity, as the greatest inconvenience and danger are the inevitable consequence of any departure from these.

Equipment
of engine
and rolling-
stock.

The quantity of engine and rolling-stock necessary for a line of railway depends on the traffic to be worked, as much as upon the length of the line.

A short line needs a much higher number of engines and vehicles per mile than a long line.

But the requirements of ordinary traffic cannot, in the absence of some available reserve of engine and rolling-stock, be considered sufficient for the emergencies of war or of famine traffic.

The Madras Railway, for instance, has enough for ordinary traffic, and probably does not once in five years have all its engines or wagons in use. But neither the Madras nor the Great Indian Peninsula Railway had enough engines for the work of 1877, nor could the East Indian Railway lend any engines.

Number of
engines. See
Table A
attached.

The average number of engines per mile of Indian railway is $\frac{1}{4.36}$, i.e., for every 4.36 miles of railway there is one engine.

The highest-stocked line is the East Indian Railway, which has an engine for every 2.92 miles; and the lowest is the Oudh and Rohilkhand Railway, with one engine to every 9 miles.

Carriage
and wagon
stock.

The most convenient measure of the carriage and wagon stock is also per mile of railway, but there is also a measure of efficiency to be got from the number of vehicles to each engine.

Coaching
vehicles
per mile of
railway.

The average number of coaching vehicles per mile is 0.71; and this number is fairly distributed, except that the Great Indian Peninsula Railway has more than one vehicle per mile.

Coaching
vehicles per
engine.

The average number of coaching vehicles per engine is 3, but the figure is as low as 1.88 on the East Indian Railway, rising to 3.80 on the Great Indian Peninsula and the Madras Railways, and as high as 5.36 on the Oudh and Rohilkhand Railway.

Goods
vehicles per
mile of
railway.

The average number of goods vehicles per mile is 4.16, varying from 7 on the Sindh Section of the Sindh, Punjab and Delhi Railway, to 2.15 on the South Indian Railway.

On the trunk lines the numbers are—

	Goods vehicles per mile of line.
East Indian Railway - " -	4.4
Great Indian Peninsula Railway - " -	5.3
Madras Railway - " -	3.5
Sindh, Punjab and Delhi Railway - " -	3.9

Goods
vehicles per
engine.

The average number of goods vehicles per engine is 17.77, but the number varies from 13 per engine on the East Indian Railway and the South Indian Railway, to 19.35 on the Great Indian Peninsula Railway, 24.21 on the Madras Railway, and 32.22 on the Bombay, Baroda and Central India Railway; and it is by considering the numbers of goods vehicles per engine in connection with the average train-load hauled by an engine, that the marked difference of equipment of the several lines in India appears.

Train-Loads.

B. B. and C. I. R. -	40 wagons.
E. I. R. load -	30 " of 10 tons load.
G. I. P. R. -	24 " of 7 " or 18 E. I. wagons, 10 tons.

When the difference of load on account of gradients is taken into account, the engine-power of the East Indian Railway is approximately double that of the Great Indian Peninsula Railway, or of the Bombay, Baroda and Central India Railway, while it is more than double that of the Madras Railway. Yet it could not be said that the East Indian Railway had too many engines for their busy season of traffic.

It is in this command of engine-power, and in the higher efficiency of the staff, as much as in the more manageable line, that is to be found the explanation of the more satisfactory working of the heavy traffic on the East Indian Railway in 1874, than of that on the railways in Southern India in 1877.

Equipment
of engines.

Another way of looking at the equipment of engines is to consider how many trains per day the engine-stock is capable of hauling over the whole length of the line.

Number of
trains a day
over the
whole line
which the
equipment
of engines
can carry.
East Indian
Railway.

Taking 20 per cent of the engines as under repairs, and 100 miles as a day's duty, both figures being nearly correct. The East Indian Railway has engines to haul 27.5 trains a day over the whole system, or 13.7 trains each way.

On the same basis, the Great Indian Peninsula Rail-

way has engines to haul 19.4 trains a day over the whole system, or 9.7 trains each way. 19.4 miles a day is considered a very high day's duty, and 64 miles a good ordinary one—for engines in India.

way engines can haul 21.8 trains a day over their whole system, or 10.9 trains each way; but including the mileage of State lines worked at present by the Great Indian Peninsula Railway for Government, the figures are reduced to about 19 trains a day over the whole system, or 9.5 each way.

Great
Indian
Peninsula
Railway

The similar figures for the Madras Railway give 12.05 trains over the whole system, or 6.02 trains each way.

Madras
Railway.

And, although the engine-power on these lines may suffice for the ordinary traffic, which is light on parts of the Great Indian Peninsula Railway and over the whole of the Madras system, it is insufficient even if the engines are all kept in first-rate order (a point of the greatest importance) to meet such pressure as arose in 1877.

And, as regards engines, it has to be considered that whatsoever may be the conditions of interchange of rolling-stock, these conditions do not apply to locomotive engines. Each Railway Company keeps its own engines, except under much pressure, or after the clearest evidence that it cannot employ them on the home line. In 1874, however, the East Indian Railway borrowed engines from the Sindh, Punjab and Delhi Railway, and this Company, largely provided as it is with engines as compared with others, was not in a position to lend more than a few inferior engines to Madras and Bombay in 1877.

Borrowing
and lending
of engines

The above remarks go to show that the equipment of Indian Railways in engines and rolling-stock should be increased, and improved in power and capacity.

Improved
equipment
necessary.

The carrying power of a railway depends—

Carrying
power of
any railway.

- (1.) On the gradients.
- (2.) On the power of the engines.
- (3.) On the relation of the net to the gross load carried in each wagon.
- (4.) On the length and equality of the intervals between stations on single lines of railway.

The engines should be as powerful as the strength of the permanent-way permits, and the relation of the net to the gross load of each wagon should be as high as possible, not less than $\frac{1}{4}$ ths, and up to $\frac{1}{3}$ ths.

As regards the 4th condition, all station intervals exceeding 10 miles in length can, in my opinion, be advantageously divided by crossing stations.

Probably the highest carrying capacity of a single line of broad-gauge railway is to be found on the Eastern Bengal Railway, or on the Bombay, Baroda and Central India Railway, when it might be put at about 3,500 tons a day, if the freight were heavy stuff, such as grain. Next would come the East Indian Railway (single line portion), where the carrying capacity would be about 3,000 tons a day.

Broad-
gauge rail-
way, single
line.

The Great Indian Peninsular Railway, single line, is, with the present wagon stock, equal to from 1,700 to 2,000 tons a day.

The same may be said of the carrying power of parts of the Madras Railway, although actual want of engines prevented the performance of any so great duty.

In all Indian Railways the carrying capacity of the single line is capable of considerable increase by the interpolation of numerous crossing places between the present stations; but the limit of working is considered to be 14 trains per day each way, which would give a carrying power of from 4,000 tons on the Bombay, Baroda and Central India, to 3,500 tons on the East Indian Railway, to 2,200 tons on the Great Indian Peninsula.

The full carrying powers of a double line of an Indian broad-gauge railway might be put at 4,800 tons on a line with gradients like the Bombay, Baroda and Central India Railway or Eastern Bengal Railway, and at 4,000 to 4,500 tons on the East Indian Railway.

Double line
of railway,
broad-
gauge.

By adding block stations on a double line of railway, the carrying capacity can easily be increased to 24 trains a day. If 20 of these are goods-trains, the carrying power would be from 7,000 tons on easy gradients to 3,600 tons a day on heavy gradients.

The carrying power of a metre-gauge railway bears roughly to that of a broad-gauge railway the same ratio as the weight of the rails. This ratio, which is at present about $\frac{1}{4}$ ths, is applicable to single and double line alike.

Metre-
gauge
railway.

A broad-gauge railway capable of carrying 3,600 tons a day would feed 7,000,000 people at the rate of about a ton per 2,000 people per day, while a narrow-gauge railway under the same conditions would feed 4,000,000 people; and these figures can be halved for lines with heavy gradients; while of course, if the demand arises at the centre, and can be met from both ends, the delivery by rail can be doubled. For instance, in Behar in 1874, 1,700 tons from the north side, and 2,300 tons from the south side, were delivered daily for some time.

Number of
trains on
English
railways,

Canal
carriage.

English railway experience shows that, on a double line with all the latest appliances of signalling apparatus, &c., a steady despatch of trains at intervals of every $\frac{1}{2}$ hour is the maximum that can be maintained. This gives 48 trains per day in each direction; but I cannot look forward to any such performance in India, for many years to come.

The carrying power of a canal without any locks is limited only by the number of boats available, and by the rate at which the boats can be unloaded at their destination; but, as on all canals there are locks, the time occupied in passing a lock, and the capacity of the lock, are the limiting factors in canal traffic. The Ganges Canal locks can hold boats of 1,200 maunds or 44 tons burden; and there are many such boats on the canal, although the average capacity is from 700 to 800 maunds, say 28 tons. It is believed that the time occupied in passing an "up" boat into a lock, locking it up, passing it out, passing in another "down" boat, locking this down, passing it out so as to leave the lock clear for another "up" boat, may be safely put at $\frac{1}{4}$ of an

hour. With sufficient lock establishment, locks might be worked for, say 20 hours out of the 24, for the night-working will never be as efficient as day-working; and on these assumptions, the carrying capacity of the Ganges Canal with the average boats would be 2,240 tons a day; and with all boats of the maximum capacity of 44 tons, this would rise to 3,520 tons a day in direction. Taking 20 miles a day as the average speed of up and down journeys, including time of loading and unloading, the number of boats required for such a traffic would be 800 per 100 miles of canal, or allowing for boats under repair, about 1,000 boats per 100 miles of canal, or 10 boats per mile.

By doubling the capacity of the locks, or by putting in additional locks alongside each other, so that two sets of boats might be worked through at the same time, and by providing double the number of boats, the carrying capacity of the canal can be doubled.

W. S. S. BISSER, *Capt., R.E.*

MOOLTAN, }
10th October 1878. }

STATEMENT OF THE TOTAL NUMBERS OF LOCOMOTIVES AND OF COACHING AND GOODS VEHICLES ON SOME OF THE RAILWAYS IN INDIA.

NAME OF RAILWAY.	1	2	3	4	Column 1. Column 2. Showing number of miles of line for each Lo- comotive Engine.	Column 3. Column 2. Showing number of Coaching Vehicles for each Engine.	Column 4. Column 2. Showing number of Goods Vehicles for each Engine.	Column 4. Column 1. Showing number of Goods Vehicles per mile of line.	NAME OF RAILWAY.
	No. of miles open.	No. of Locomo- tives.	No. of Coaching Vehicles.	No. of Goods Vehicles.					
Madras - - -	855	128	492	5,100	6.67	3.84	24.21	3.5	Madras,
South Indian - - -	400	66	190	860	6.06	2.87	13.03	2.15	South Indian.
Great Indian Peninsula -	1,266	345	1,314	6,679	3.66	3.80	19.35	5.3	Great Indian Peninsula.
Bombay, Baroda and	430	85	295	2,789	5.05	3.47	32.22	6.4	Bombay, Baroda and
Central India - - -									Central India.
East Indian, Main and	1,504	515	967	6,664	2.92	1.88	13.00	4.43	East Indian Main, and
Jabalpur Lines - - -									Jabalpur Lines.
Eastern Bengal - - -	158	43	104	707	3.62	2.41	16.44	4.46	Eastern Bengal.
Oudh and Rohilkbund -	545	60	322	1,258	9.08	5.36	20.96	2.38	Oudh and Rohilkbund.
Punjab and Delhi - - -	554	131	465	2,140	4.22	3.54	16.33	3.86	Punjab and Delhi.
Sindh (including Flotilla)	110	25	64	770	4.40	2.56	30.80	7.	Sindh.
Rajputana - - -	400	60	205	1,000	6.66	3.41	16.66	2.50	Rajputana.
TOTAL - - -	6,222	1,458	4,418	25,917	4.26	3.03	17.77	4.16	

XIII.—SUPPLY AND TRANSPORT OF FOOD IN TIME OF FAMINE.

ANSWERS BY MR. A. MACKENZIE, PRESIDENT OF THE CHAMBER OF COMMERCE, MADRAS,
TO QUESTIONS PUT BY THE FAMINE COMMISSION.

QUESTION 1.—*What, in your opinion, was the effect on trade—*

- (a) *at the places where grain was purchased,*
(b) *at the places to which grain was imported—*
of the purchase of grain by Government at the beginning of the famine?

It is presumed that in the enquiry of the Famine Commission as to the effect on trade, they mean the effect on grain trade simply—not on local exchange, rate of interest, freights, and similar matters¹.

I may remark briefly, and in general terms, that a purchase by Government ought not to disturb the market any more than one by any other large operator, so long as the operation is kept in one hand. Of course, if Government set to work buying through half-a-dozen different agents simultaneously, it would merely create competition against itself, *i.e.*, amongst the different buyers.

I am inclined to think that the purchase of grain on account of Government did not materially affect the market: those purchases, it is believed, were all effected, or contracted for, before the end of November 1876. Now, the rise of prices¹ up to the end of that month was comparatively small—not more than about 10 per cent.: whereas the rise from the 1st to the 22nd December—a period during which no fresh purchases were being made for Government—amounted to as much as 25 per cent. Then, again, between the 18th May and the 24th July 1877 there was no question of purchases by Government, yet in that interval the rise in prices amounted to as much as 60 per cent. It would appear, therefore, that the market suffered very much less disturbance at the time when Government was a buyer, than it did at subsequent periods. It is impossible to say what the consequences might have been had Government continued its purchases on anything like a large scale; but the insignificant quantity which it really did buy—not 4 per cent of the twelve months' imports—was a great deal too small to affect the market one way or another.

QUESTION 2.—*What would have been the effect had the system of Government purchases been continued, and the grain used—*

- (a) *to feed the labourers on relief-works, and inmates of relief-camps;*
(b) *to sell to the public wherever prices at the place where the grain was stored should reach a rate previously fixed and announced to the public?*

If the grain purchased by Government had been used—which I presume is the meaning of this question—for payment of grain-wages, instead of cash, to the labourers on relief-works, the effect would of course have been to withdraw so much demand for grain from the various local markets. It is impossible to hazard an opinion as to what the effect on prices would have been, without having very much more detailed information than is at my command. Relief-works were scattered over a very large extent of country, and during the famine were supplied from many different points, the prices at which were affected by many different circumstances. It is impossible to say in general terms what the effect on the general grain-trade would have been; beyond this one broad principle—that, if the Government had provided the labourers on relief-works with so much grain as they required for daily consumption, the effect must have been to diminish by so much the demand for supply by private trade.

In regard to the inmates of relief-camps, the same general principle applies, with this distinction—that, in regard to them, the Government was, it is believed, during the recent famine, as a general rule, itself a purchaser in the local bazar. In both cases, whether in regard to labourers on relief-works who received

money from Government to buy grain, or inmates of relief-camps for whom Government bought grain direct in the bazar, the effect of the principle actually followed was the same. Government supplied the fund with which supplies were procured from private trade in the local bazar. Had Government itself supplied the grain instead of the money to buy it, the opportunity for private trade would have been diminished proportionately. The Famine Commission can probably calculate the percentage of population which was thus supplied with food by means of Government money; and a comparison of the food required to supply that proportion of population with the total importation of grain into the afflicted districts (detailed information on both which subjects is, I presume, in the possession of the Commission) will serve to show what proportion of private trade would have been displaced by the Government agency. So far as my own information goes, the result would appear to be as follows. The population afflicted, including Mysore, appears to have been about 23 millions. So far as I can see, the numbers provided for by Government on relief-works, and gratuitously, never exceed 3 millions at any one time—say, an average of 15 per cent of population. Take the worst period of the famine, say the year from November 1876 to November 1877, in which time the importation of grain into the Presidency of Madras appears to have been 900,000 tons, or sufficient for the daily support of 5,600,000—say 25 per cent of the population. If Government action had provided for 15 out of this 25, only 10 would have remained for private trade. In other words, Government would have supplied three-fifths, or 540,000 tons out of the 900,000. It is not necessary that this should have been by displacement of wholesale private trade. Had Government got its supplies *by tender for delivery at certain specified points*, the probability is that the supply would have been by much the same importers who actually were active during the famine; and these latter would have had the advantage of trading upon certain specified basis of prices obtainable and quantities required, instead of, as actually was the case, taking very speculative risks on comparatively unknown premises. What the effect of such displacement would have been in interior markets it is impossible to say, for reasons to which I will hereafter refer as dependent upon the question of transport.

(b) All would depend upon the rate fixed as the maximum price which Government would permit to be reached in any condition of the market. If such a price left a fair margin for profit in private enterprise, that enterprise would have continued so long as the profit could be secured; and when grain could no longer be imported to any given point below the rate at which Government had declared their intention to sell reserve stocks, private enterprise would naturally withhold supplies which could evidently only be sold at a loss. In view of such a possibility, the reserve of Government would necessarily need to be on a very large scale, and there would be the possibility, indeed certainty, of a large stock being left at the end of the famine when prices cheapened, for re-sale at a heavy loss to Government. If the Commission will only study the range of prices of grain in Calcutta, which was the chief port of supply between October 1876 and November 1877, they will see how prices fluctuated at various periods, the differences between the highest and lowest points at different times being from 20 to 60 per cent. (for example, between 22nd December 1876 and 15th May 1877, prices fell nearly 20 per cent.; between the latter date and 24th July they rose 60 per cent.); and they can understand, therefore, that causes quite apart of the Government action suggested in the question under reply, influenced prices during the famine, and would doubtless have similarly done so even had such a course as is suggested been adopted; that, therefore, there would have been times when the trade could have sold at a fair profit below the Govern-

¹ I refer to Calcutta—the port whence the chief supplies were drawn.
A. M.

ment standard rate; while, at other times, the Government would have had to open its stores and supply those dependent upon it, until the fall of prices at other places should allow of private trade again taking up the supply.

QUESTION 3.—*Supposing it to be desirable that Government should hold a reserve stock to be used exclusively for the two purposes specified above, was the mode adopted by the Government of Madras for purchasing grain the best that could be adopted under the circumstances? If not, what method would you recommend?*

The answer to this question depends altogether upon the words "under the circumstances." I am disposed to think that, under the circumstances of information in their possession at the time—considering the comparative suddenness with which the necessity for action in consequence of the failure of the north-east monsoon had come upon them, and the general want of an organized system throughout the country, and the example of the famine in 1873-74 for their guidance—the action taken by the Government of Madras was the best that could at that time be adopted under all the circumstances; but I should not recommend a similar course in any future famine. I see no reason why Government should not enter into contracts for the supply of the inmates of its relief-camps, and its labourers on its relief-works, just as it does in ordinary times for the supply of, e.g., its hospitals, its commissariat department. The only precaution necessary is that its action should be made upon certain definite rules and ascertained wants, with the utmost publicity, and on the most favourable terms which can be procured in the market. And I see no reason why all these objects should not be attained without in any way whatever inflicting injury upon private trade. For example, I think that, with a proper system of information, and previous organisation, the Government should be able to calculate pretty accurately, at the commencement of a famine, what number of pauper or helpless individuals would have to be gratuitously provided for at certain given points; and for what number of labourers out of ordinary employment it would have to find special work, and at what points it would employ them. With this information it could readily calculate what quantity of grain it would require for its relief-camps, and for its relief-works, wages, &c., &c. It would then invite tenders for delivery, at the nearest points to its different centres of operation, of a certain amount of grain, weekly or monthly as the case might be; and, those tenders once given off, the trade would be able to calculate with exactitude—first, what the demand for supply of contracts entered into with Government must be, weekly or monthly, in the districts from which the supplies would have to be drawn; and secondly, what would be the probable consumption or demand of the remaining population of the afflicted districts.

QUESTION 4.—*Is the information available to the trade in times of famine as to the prices in distant markets, and as to the demand that exists, or is likely to spring up, sufficient to secure the necessary activity? If not, by what means can the information be promptly, and accurately obtained?*

I hardly understand what is meant by the term "necessary activity." As a matter of fact, the trade were, throughout the famine, a great deal too active for their own advantage. The Commission appears to have overlooked altogether the fact that activity of import is altogether subordinate to the facilities for transport. Now, as a fact, the importation of grain into all ports of the Presidency of Madras, from 1st November 1876, to the same date in 1877, appears to have been, in round numbers, rather over 900,000 tons, or, say, an average of about 2,500 tons per diem. But the entire transport of all the railways only once reached 2,500 tons daily, and that was in August 1877. In the early months of famine the transport barely reached 1,000 tons, and the average may be set down as from 1,400 to 1,600 tons daily. At one time (end January 1877) it was estimated that in Madras alone there was more grain awaiting transport to the interior,—much of it without shelter, exposed to robbery, damage by weather, &c., and representing also a heavy loss in interest to its proprietors, while waiting for transport to its market—than the railway could remove during the next three months. That all this grain was imported on actual or reliable information as to the wants of the interior, I should be sorry to say. No doubt very exaggerated ideas were

afloat of the demands of the district. But I have no doubt that in future the experience of 1876-77 will be remembered, and importers will be guided far more by the transport they may be able to secure, than by any estimates of interior requirements.

How thoroughly accurate information can be obtained as to the state of the agricultural districts in times of approaching famine, if by this is meant an accurate estimate of existing stocks, it is very difficult to say; but I should think that, with the elaborate revenue system which at all events the Southern Indian Government possesses, it ought not to be very difficult to make at least this estimate: what proportion of the population would not require assistance, or would not be dependent upon imported grain. Every one knows that all the well-to-do farmers have very large hoards of grain, which they keep in pits, especially in the dry districts, often for many years. The existence of these stores must be thoroughly well known to the village headmen; and I should imagine that, through the village monegars and tahsildars, deputy collectors, and so on through all the grades up to the collectors, it would be easy to tabulate a statement showing what proportion of the population of each taluk, collectorate, and the entire country, might be considered as independent for many months to come of any importation of grain. No doubt a sifting process would have to be applied to the residue, but my impression has for a long time been that at least 50 per cent. of the population throughout the recent famine lived and survived the famine upon their own stocks. I believe the importations were not more than enough to provide for about 25 per cent. of the population; and, even allowing a large margin for deaths and emigration, I do not see how a smaller proportion than 50 per cent. throughout the recent distress could have lived and survived the famine unless upon pre-existing stocks. I think also that it might be easy, or comparatively easy, for the Board of Revenue, through its subordinates down to the village monegar, to obtain a pretty accurate idea of the number of daily labourers and of paupers in the country; and, with information of this character before it, the Government would be able to notify to the public, on the approach of a famine, that distress was expected, and importations of grain would be necessary in certain districts containing a certain population, of which it was believed that a certain proportion would be independent of importations. A certain proportion of handicraftsmen, town populations, &c., would require importations of so much grain per month, for sale by private trade in the bazars; and for the supply of the remainder, who would pass into relief-camps and on to relief-works, the Government would invite tenders from the wholesale trade, as I have suggested above.

QUESTION 5.—*Do you consider that there is any necessity for legislation as to—*

- the better control of the port, and the landing boats, in times of emergency;*
- the better control of paupers, immigrants into the city;*
- any other matter connected with famine relief?*

There is ample legislation for the control of the boats, &c. There were many complaints during the landing of grain, in the time of the famine, of boats being badly damaged, and cargo damaged in consequence; but this arose from want of exercise of the powers possessed by the Port authorities, not from a want of such powers.

There was very great want of proper regulation on the beach for preventing pilfering, &c.; but here, again, not from any want of legislation, but simply from want of establishment. How could the comparatively few available police constables deal with some 10,000 coolies and others (women and children) assembled daily on the beach and roads adjoining, for the express purpose of plundering, and no other. Possibly a little summary discipline, permission to merchants to have their servants sworn in as special constables, and the erection of half-a-dozen flogging posts along the beach, with two or three special magistrates sworn in with summary powers, would have cured this in a few days; but the Government did not appear to think that measures of this character would be humane to a starving population. Accordingly, a quiet looting of the grain bags went on unchecked for many months, without the necessity of any riotous attack on bazar shops, which might have been followed by unpleasant consequences to the perpetrators.

It is generally admitted among the importers of 1876-77 that the average "loss in weight" during

transit reached, if it did not exceed, 10 per cent., instead of from 3 to 5 as in ordinary times. My own experience is that 10 per cent. is too low an estimate; but, assuming an excess loss of 5 per cent. as due to the incessant pilfering which went on at all stages of transit, and taking Rs. 100 per ton (which is a low figure) as the average value of the 900,000 tons imported during the year November 1876 to November 1877 we have a practical and direct contribution by the grain merchants towards the support of the general population of no less amount than 45 lakhs—that 45 lakhs, or the value of grain lost to the merchants by pilfering, representing in effect so much lost profit which they would otherwise have realised.

(b) I believe that these matters were very well looked after; certainly, when I returned from England in February 1877, I was surprised to see such very few evidences of any distress in the streets of the city; and the same remark was very often made by visitors to Madras during the famine.

(c) This opens up far too wide a field to be disposed of in one question. But I take advantage of it to lay before the Commission my views upon an important element in all Indian families, which are, that distress is mainly among the agricultural portion of the population thrown out of work by the failure of their ordinary employment, and the few small trades or handicrafts which are chiefly dependent upon them for sale of their manufactures; that, among this class, distress arises, not so much from an actual want of food, as from a loss of wages—in other words, money to buy food; that, as a general rule, there is abundance of food procurable, even in the worst districts at the worst time; but when men who, at the best, merely live from hand to mouth, are deprived of their means of earning wages, they starve, not from the impossibility of getting food, but for want of the necessary money to buy it. I have always considered that the true remedy for the distress which overtakes certain districts of India, when, from the failure of the rains or other causes, the ordinary cultivation of the land cannot be carried on, must lie in taking the population, or a certain large proportion of it, off its dependence upon an agricultural wage, that is, in the introduction of other forms of employment which will not be affected by climatic causes. What India requires is that her population shall have the means of earning wages, independent of the vicissitudes of climate.

Apart from many other articles of ordinary consumption which might perfectly well be manufactured in this country, India imports to the value of some 16 or 17 million sterling of cotton goods annually; and

it is not too much to say that, with a little management, the whole of this might be produced locally, thereby creating a large and valuable channel of employment, while enormously increasing the balance of trade in favour of this country, and thus arriving at the only true and practical solution of the exchange difficulty. Apart from cotton goods, there are, as I have said, many manufactures which might be introduced and encouraged in the country, all the materials being on the spot, and abundant labour if only it were trained in the right direction.

With the firm conviction that India's future depends upon the prompt development of a large system of manufactures for her own internal wants, I would earnestly solicit the attention of the Commission to this subject, in which, more than anything else, will, I believe, be found the true remedy for what is at present called "famine" in seasons of partial failure of the cultivation. The term has always seemed to me somewhat incorrect, for the distress is due mainly to the failure of work, not to the absence of food—a "famine" of wages perhaps, but not, properly speaking, a "famine," as the term is usually understood.

The Commission may perhaps consider that the failure of crops and consequent necessity for import of grain into Southern India may properly be said to create a state of famine. But if such an argument is correct, then Great Britain is in a chronic state of famine, for, in addition to very large supplies of meat (fresh and preserved), tea, coffee, wines, spirits, and similar articles of aliment, the United Kingdom imports annually over 30 per cent. of its consumption of corn, while the famine districts of Southern India, as I have shown before, imported only 25 per cent. in the recent "famine year." But the relative proportion of the purely industrial and agricultural labouring populations of the United Kingdom may be expressed by 3 to 1; whereas, in India, the probability is that for every industrial we have at least 20 agriculturals. India has the lesson of England's prosperity to guide her. The only true "Preventive of the Famines" from which she periodically suffers will be found in the development of manufacturing industry and the consequent profitable and continuous employment of a large proportion of that excess of labour which at present hangs as a dead weight upon the soil dependent for the year upon the desultory and intermittent field-labour of a few months.

A. MACKENZIE.

MADRAS:
25th February 1879, }

ANSWER BY THE CHAMBER OF COMMERCE, MADRAS, TO THE SAME QUESTIONS.

The members of this Chamber have carefully considered the questions which you submitted to them in your letter of the 29th January last.

Considering the speculative character of some of the questions, you will not be surprised to learn that considerable differences of opinion are found to prevail on some points. The Chamber infer, however, that your Commission would prefer to have their views as a body to their opinions as individual merchants, and I have been desired, therefore, in my replies to your questions, to mention only such facts as are generally accepted by the local mercantile community as being beyond dispute.

I will proceed, therefore, to answer the questions in the order in which they are put.

Question 1.—It is very difficult to say how far trade was actually affected either under *a* or *b*; because so soon as the fact that Government was purchasing became known, objections were made, and further purchases on behalf of Government were forbidden. But had purchases been continued, it is the opinion of the Chamber that the effect would undoubtedly have been:—

(a) To raise prices excessively.

(b) To paralyze private trade.

Question 2.—(a). To restrict private imports very seriously.

(b). Probably to put a stop to them altogether.

Question 3.—No. Public tenders, with ample notice and full information to the trade, would have produced the grain at the places required at the cheapest rates.

Question 4.—The Chamber see no reason to doubt that the information at the disposal of the mercantile com-

munity was sufficient. It was clearly demonstrated that private trade was prepared to and did import grain far in excess of what all the railways and carts could carry away.

Question 5.—(a). The quantity of cargo landed by the boats was so far in excess of what was considered possible before the famine commenced, that the Chamber would hesitate to recommend any measures calculated to check the enterprise of the boatmen. The Boat Act provides ample powers for the control of boats, but it was practically impossible, and would have been injurious, to exercise them as regards the limitation of fare.

(b). The Chamber do not think that any special legislation is required for the control of pauper immigrants. All that seems to be required for the maintenance of order in the city is a well-organised and efficient police force.

(c). The Chamber take advantage of the latitude permitted by this inquiry to record their opinions on a subject which has not been touched upon by the Famine Commissioners, *viz.*, the allotment of railway waggons for the carriage of grain into the interior during the famine.

The allotment was, it is understood, made under a system specially devised and ordered by the Madras Government, but which was, the Chamber venture to think, somewhat disadvantageous to the interests of the shareholders in the railway, and decidedly oppressive and unfair to importers; while its effect in course of time would undoubtedly have been to gradually reduce importations to a very low point.

The action of the Government appears to have been based upon the theory that it is desirable to accord special facilities in transport to traders resident in principal district towns; that otherwise importers would enjoy a practical monopoly of the carriage available; and that thus the entire grain supply of the interior would be left in their hands, and that they would, injuriously to public interests, demand excessive rates of profit wherever such monopoly existed.

It is unnecessary to trace the progress of transport throughout the famine. It will suffice if we take the time of greatest activity, say July-August 1877. At that time out of some 1,400 waggons despatched per week from Madras, the eight European firms who were the chief importers, obtained nominally 320 waggons, and the five large Native importers 200, so that while 500 waggons per week were granted to the chief importers, 900 were left for outside speculators and casual operators.

It was currently supposed, and the Chamber are able to say from their information with good reason, that many of those 900 waggons were allotted to persons who never imported or purchased any grain, and who simply transferred the use of the waggons allotted to them, for a consideration, to traders from up-country, or to others who required to despatch grain. In this manner the cost of transport was in many instances largely increased, to the injury of the consuming public, and without any benefit to the shareholders of the railway.

As regards the chief importers, their position was this—that while enormous stocks of grain were lying in Madras, waiting for transport at great loss of interest and expense in godown rent (and as sufficient godown accommodation was not available, to a great extent exposed without shelter to the injurious influences of the weather, risk of pilfering, &c.), they were refused more than a very meagre allotment of waggons, wholly disproportionate to the large stocks they held; while at the same time traders from up-country markets, where there was a brisk demand and high prices, could obtain waggons to transport as much grain as they could buy in Madras. These up-country traders, it must be remembered, ran none of the risks of import, and incurred none of the necessary outlay in funds, establishment, &c. They found a large stock ready in Madras, purchased and paid for in many cases three and four months previously, which the importers were anxious, but were not permitted, to send up-country. They could supply themselves from day to day out of this stock, and procure waggons for sending their purchases to the most profitable markets, which waggons under Government orders could not be allotted to the original importer. Those original importers were thus prevented by the Government system of waggon allotment from reaching the interior market, and the middlemen took advantage of the importers' difficulties to buy grain, whenever, but only whenever, they saw the chance of making a profit out of the transaction.

As regards the interior markets, the effect was to create a monopoly just as much as if they had been left to the care of the original importers. The monopoly was in the hands of those who could get the waggons, and it made no difference whether these were original importers or occasional speculators. But it may very reasonably be argued that men who only went in for an occasional speculation when prices were high, were not satisfied with such a rate of profit as would have amply repaid an importer on the average of his transactions; and it is evident that the grain had under this system to bear two profits instead of one. The original im-

porter and the favoured district trader both required a profit out of the transaction, and the effect must have been injurious to consumers' interests.

The effect upon importers was necessarily discouraging; they were under heavy outlay, had incurred considerable risk, saw their property deteriorating daily, and in order to prevent further deterioration were compelled to abandon their expectation of selling in the more profitable up-country markets, and to sell to the intermediate speculator, who was allowed facilities of transport which were denied to them. They saw the markets for which they had imported practically closed to them, and much of the profits on which they had reckoned pass into the pockets of men who incurred no risk whatever. They found their remonstrances disregarded, their property suffering injury, and the chance of a profitable market passing by, until ultimately their imports could actually only be sold to a loss. Under such circumstances they naturally resolved not to import. Orders already sent were countermanded to a very great extent, and most undoubtedly had it not been for the rains in August, September, October 1877, which ensured an early harvest, and brought out much of the hidden stocks of grain about the country, the necessary ultimate effect of the Government policy of allotment of grain waggons would have been evidenced by a disastrous scarcity of supply in the later months of the year.

Fortunately for Government, though unfortunately, as the Chamber think, for other reasons, the necessity for further supplies ceased before the full effect of the Government system of waggon allotment could be felt and a record established to serve as a warning against the adoption of a similar principle in cases of famine hereafter.

The Chamber would urgently impress upon the Commissioners that no activity of imports to the sea-port towns can suffice to meet scarcity of grain in the interior unless it is seconded and supported by facilities of transport; and that these two important factors of supply—import by sea, and transport by rail or road—must work together to ensure efficiency. If importers are not allowed to transport, their imports are to them useless. As they do not import for the coast market, but in view of the possible sale in the interior markets, they will naturally import only to the extent of the transport facilities allowed them. There will therefore be no surplus of import available for the petty trader from the interior, who, though allowed abundance of transport facilities, does not care to take the risk of import—who only ventures into the market when he sees a certain profit on a transaction extending over a few days.

The Chamber would suggest that waggons might be allotted in either of the following systems:—

First.—To the different importers in proportion to their actual importations.

Second.—By daily registration. For example, applications might be registered up to 12 o'clock on Monday for waggons for the following Wednesday. By 2 p.m. allotment could be made of the available waggons rateably among the applicants, and delivery orders issued to them that same afternoon on payment, all allotments not paid for by noon the next day being cancelled. This would prevent the intrusion of speculators in waggons who only seek to make, under the system of payment on delivery of goods, a profit on the transfer of the waggons, who have no grain to forward, and have no intention of using the waggons themselves, or making any payment themselves for their use.

NOTE IN EXPLANATION OF SIR JOHN STRACHEY'S SPEECH TOUCHING ON THE PROFITS MADE BY TRADERS IN THE MADRAS FAMINE, BY MR. C. BERNARD.

12th February 1879.

The estimate of 40 Rs. per ton profit was intended to be an inside approximation to the extra profits made in 1877 by grain producers and grain dealers together, as compared with an ordinary year.

For instance, let us take the case of Dinagepore rice going to Madras, and of Allyghur jowari (millet) going to Bellary in August 1877. The grain exported in 1877 would ordinarily be the produce of the harvests of the cold weather of 1876-77. The crops that season were good both in Dinagepore and Allyghur, for I find that

in February, when the winter crops had fairly come into the market prices were:—

	February 1877.	February 1876.
	Sacs per Rupee	Sacs per Rupee.
Dinagepore rice	- 28	24
Allyghur jowari	- 36	37

It was in August that the grain traffic to Madras was heaviest; and by August no doubt a good deal of the grain available for export had passed out of the hands of the producers into the hands of the dealers. By August the market price of jowari has generally gone

up a good deal, so also has the price of rice in ordinary years. But in Bengal, if the "aus" or early rice promises well, the price of common rice sometimes falls in August. In 1877 the August prices were as follows:—

Rice—

	Seers	Per ton.
	Per Rupee.	Rs.
Dinagapore - - -	26	43
Madras - - -	5½	205

Jowari—

Allyghur - - -	30	37
Bellary - - -	4½	252

The distance from Allyghur to Bellary by railway (both places being on the rail) is 1,622 miles, and the cost of carrying the grain at one anna per ton per mile would be Rs. 102 per ton. To the cost of carriage must be added—"bags," 5 Rs. a ton; agency, cart hire at stations, bribes to railway people, interest, &c. (say) 20 Rs. a ton. And we get the total cost of the grain delivered at Bellary:—

	Per ton.
	Rs.
Retail market price at Allyghur - -	37
Railway freight - - -	102
Bagging and miscellaneous - - -	25
Total - - -	164
Against a Bellary retail price - -	252
Balance - - -	88

This is much more than 40 Rs. a ton; but then the ventures in the spring were not quite so successful, and the margin of profit was smaller. Anyhow, for such consignments 40 Rs. a ton extra profit to grower and dealer is within the truth.

For Dinagapore the figures work out thus:—

	Per ton.
	Rs.
Cost price of rice at Dinagapore - -	43
261 miles' freight to Calcutta, part river and part rail, at (say) two annas per ton per mile - - -	33
Freight of steamer from Calcutta to Madras at highest quotations of the year - - -	20
Bagging - - -	5

Brought forward - - -	101
Agency, Rs. 10; portorage, Rs. 5; lighterage, in the Hooghly and Madras roads, Rs. 20; and cartage, Rs. 5 - - -	40
Total - - -	141
Madras price per ton - - -	205
Balance - - -	64

I have taken the miscellaneous charges at the very highest figures, yet the balance (or profit) works out considerably above 40 Rs. a ton.

If it be said that these figures prove too much, and that the price at Allyghur and Dinagapore must have gone up higher in August if profits were really so large, I would reply that exportable stocks were by August mainly in the hands of dealers and large holders. If Government or any one else had gone into either of these markets to buy largely, they could not have obtained any considerable supply without paying sums far above the market quotations of the retail dealings. Anyhow the local quotations of August gave to producers larger profits than they would get ordinarily in a year of universal abundance. In August 1877 the Calcutta price was 98 Rupees per ton, as compared with 70 Rupees in the same month of 1876; yet the rice harvest in Bengal of 1876-77 was better than in 1875-76.

I have no doubt but that 40 Rs. a ton is an inside estimate of the extra profit which accrued over and above ordinary years, on the grain dealings with the famine country to producers and dealers together. There was also a large class of middlemen, carters, boatmen, and such people, who also made a considerable extra profit.

C. BERNARD.

P.S.—I have already made my story very long, but I should like to say that the producers get their share of the profit, in part, from prices for the 1877-78 or subsequent rice harvest. As some proof of this I cite the instance of the great Durbhanga estate got in, during the year ending October 1878, more rent than it ever did before. It collected 117 (or 121, I forget which) per cent. on the current demand. The ryots paid up the current and arrear demand easily and readily, because (so the manager tells me) they had excellent crops and very high prices. The Durbhanga rental is about 18 lakhs.

MEMORANDUM.

The following remarks may perhaps be useful in connection with the annexed statement of the prices of food-grains during the famine of 1876-77.

It will be seen that in August 1876, that is, when the

failure of the rains first gave indication of scarcity and of probably distress, the prices in seers per rupee were—

FOR COMMON RICE.

In Madras Presidency.			In Bombay Presidency.			In Mysore Province.			Hyderabad.	
	S.	C.		S.	C.		S.	C.		S. C.
In Cuddapah - -	10	8	In Ahmednagar - -	10	0	In Bangalore - -	10	0	In Secunderbad.	about
„ Bellary - -	10	8	„ Poona - -	11	0	„ Tumkur - -	9	2		10 14
„ Kurnool - -	12	13	„ Sholapore - -	12	8	„ Mysore - -	8	1		
„ Madras (Town)	11	4	„ Kaladgi - -	11	11	„ Kader - -	10	8		
„ Salem - -	12	11	„ Dharwar - -	14	14	„ Chitaldroog - -	10	0		
„ South Arcot - -	13	11				„ Hassan - -	9	13		

During the same period the quotations for common rice in the places of supply were—

	s.	c.
In Calcutta - - -	16	0
„ Chittagong - - -	15	0
„ Balasore - - -	32	0
„ Cawnpore - - -	18	0
„ Meerut - - -	17	0

In Nagpore - - -	16	0
„ Akola - - -	10	0
„ Jubbulpore - - -	16	8
„ Rangoon - - -	14	6

Then, as the effects of the failure of the rains became more marked, the prices went on steadily rising until they were in January 1877 as follows:—

In Madras Presidency.			In Bombay Presidency.			In Mysore Province.			Hyderabad.		
In Cuddapah -	s. c.	6 11	In Ahmednagar -	s. c.	8 14	In Bangalore -	s. c.	6 9	In Secunderabad.	s. c.	7 5
„ Bellary -	7 0		„ Poona -	8 9		„ Tumkur -	6 0				
„ Kurnool -	6 4		„ Sholapore -	9 7		„ Mysore -	5 12				
„ Madras (Town) -	7 7		„ Kaladgi -	6 7		„ Kadur -	6 2				
„ Salem -	7 5		„ Dharwar -	7 14		„ Chitaldroog -	6 0				
„ South Arcot -	8 12					„ Hassan -	6 7				

This general dearness in the stricken districts had a marked effect on the prices at the places of supply, as the following table, if compared with that of the prices in August 1876 will show:—

	In January 1877.	
	s.	c.
In Calcutta -	14	0
„ Chittagong -	15	0
„ Balasore -	22	0
„ Cawnpore -	16	0
„ Meerut -	18	8
„ Nagpore -	15	8
„ Akola -	8	8
„ Jubbulpore -	18	8
„ Rangoon -	16	7

Showing a rise in Calcutta, Balasore, Cawnpore, Nagpore, and Akola, though plentiful crops had caused a fall in Meerut, Jubbulpore, and Rangoon.

During the three following months (February, March, and April) when the spring crops were being harvested and brought into the market, although the scarcity in the distressed districts was but temporarily affected, still the prices, which had gone on rising steadily from August 1876 to January 1877, showed a decided tendency to fall during the latter months, especially in Madras, and stood thus in March and April:—

In Madras Presidency.			In Bombay Presidency.			In Mysore Province.			Hyderabad.		
In Cuddapah -	s. c.	8 3	In Ahmednagar -	s. c.	8 3	In Bangalore -	s. c.	7 2	In Secunderabad -	s. c.	7 2
„ Bellary -	8 2	8 4	„ Poona -	8 9	8 9	„ Tumkur -	6 1	6 7			
„ Kurnool -	6 6	6 5	„ Sholapore -	9 7	9 7	„ Mysore -	6 2	6 3			
„ Madras (Town) -	9 3	9 8	„ Kaladgi -	6 7	5 6	„ Kadur -	7 0	6 5			
„ Salem -	7 5	8 3	„ Dharwar -	8 1	6 9	„ Chitaldroog -	5 11	6 5			
„ South Arcot -	9 13	10 5				„ Hassan -	6 4	6 1			

But with the failure of the ordinary June monsoon a prolonged deficiency of food became inevitable, and

prices rapidly rose again till they reached the following figures in July and August:—

In Madras Presidency.			In Bombay Presidency.			In Mysore Province.			Hyderabad.		
In Cuddapah -	s. c.	6 8	In Ahmednagar -	s. c.	7 9	In Bangalore -	s. c.	5 3	In Secunderabad -	s. c.	5 13
„ Bellary -	5 13	5 5	„ Poona -	6 12	5 15	„ Tumkur -	4 9	4 3			
„ Kurnool -	4 11	5 5	„ Sholapore -	6 10	4 11	„ Mysore -	4 3	4 2			
„ Madras (Town) -	6 12	5 14	„ Kaladgi -	3 9	3 10	„ Kadur -	3 14	4 0			
„ Salem -	5 4	5 5	„ Dharwar -	4 6	4 3	„ Chitaldroog -	4 2	4 2			
„ South Arcot -	6 3	6 3				„ Hassan -	4 6	4 2			

And during these two months the prices at the places of supply were—

	s.	c.	s.	c.
In Calcutta -	11	6	11	4
„ Chittagong -	12	0	11	8
„ Balasore -	19	8	14	8
„ Cawnpore -	13	0	10	12
„ Meerut -	13	0	12	0
„ Nagpore -	12	10	10	10
„ Akola -	8	0	7	8
„ Jubbulpore -	13	8	11	12
„ Rangoon -	12	7	8	10

These prices are on an average double those quoted

in the distressed districts during the same period (July and August), and, notwithstanding the continued drain on the resources of Northern India, and the prolongation of the scarcity, justified the confidence of Government in the capacity of private trade to fill the void in the distressed districts. In September the first indication of a real turn in the tide is observable, and from the commencement of the rain which fell in that month, and to some extent owing perhaps to the improved facilities for railway transport, a fall set in, which, as shown in the following table, continued till the end of the calendar year; thus:—

In Madras Presidency.			In Bombay Presidency.			In Mysore Province.			Hyderabad.		
In Cuddapah -	Sept.	Dec.	In Ahmednagar -	Sept.	Dec.	In Bangalore -	Sept.	Dec.	In Secunderabad -	Sept.	Dec.
„ Bellary -	s. c.	5 15	„ Poona -	s. c.	5 13	„ Tumkur -	s. c.	4 9		s. c.	5 13
„ Kurnool -	5 0	5 0	„ Sholapore -	7 1	7 12	„ Mysore -	4 2	5 10			
„ Madras (Town) -	6 4	8 2	„ Kaladgi -	4 1	6 12	„ Kadur -	4 1	8 8			
„ Salem -	5 2	7 10	„ Dharwar -	4 6	10 3	„ Chitaldroog -	4 5	6 0			
„ South Arcot -	6 3	8 5				„ Hassan -	3 11	6 11			

In the places of supply also prices grew cheaper all round from August to December; thus:—

		September.	December.		September.	December.
		s. c.	s. c.		s. c.	s. c.
In Calcutta	-	11 12	11 14 ¹	In Akola-	-	7 0
„ Chittagong	-	13 0	18 0	„ Jubbulpore	-	9 8
„ Balasore	-	15 0	17 0	„ Rangoon	-	7 13
„ Cawnpore	-	9 0	9 8			
„ Meerut	-	9 0	9 0			
„ Nagpore	-	10 4	11 4			

Now the above extracts may be condensed into the following tabular statement, which will facilitate a comparison of the prices which ruled in the four affected Provinces, and will show the fluctuations generally:—

DATES.	MADRAS PRESIDENCY.						BOMBAY PRESIDENCY.					MYSORE PROVINCE.						Secunderabad.
	Cuddapah.	Bellary.	Kurnool.	Madras Town.	Salem.	South Arcot.	Ahmednagar.	Poona.	Sholapore.	Kaladgi.	Dharwar.	Bangalore.	Tumkur.	Mysore.	Kadur.	Chitaldroog.	Hassan.	
August 1876	10 8	10 8	12 18	11 4	12 11	13 1 ¹	10 0	11 0	12 3	11 11	14 14	10 0	9 2	8 1	10 8	10 0	9 18	—
January 1877	6 11	7 0	8 4	7 7	7 5	8 12 ³	8 14	8 9	9 7	8 7	7 14	6 9	6 0	5 12	6 2	6 0	6 7	7 5
March „	8 3	8 2	6 6	0 3	7 5	9 13	8 5	8 3	9 7	6 7	8 1	7 2	6 1	6 2	7 0	5 11	6 4	7 3
April „	8 8	8 4	0 5	9 8	8 3	10 5	8 9	8 9	9 7	5 6	0 9	8 0	6 7	6 3	6 5	6 5	6 1	7 2
July „	6 8	5 18	4 11	6 12	5 4	6 3	7 9	6 12	6 10	3 9	4 6	5 3	4 0	4 3	3 14	4 2	4 6	5 13
August „	5 18	5 5	5 5	5 14	5 5	6 8	5 15	5 15	4 11	3 10	4 2	5 2	4 3	4 2	4 0	4 2	4 2	—
September „	6 6	5 15	5 0	6 4	5 2	6 3	5 18	5 18	7 1	4 1	4 6	5 1	4 9	4 2	4 1	4 5	3 11	—
December „	10 0	6 5	5 0	8 2	7 10	8 5	7 7	7 6	7 12	6 12	10 13	7 6	7 0	5 10	8 8	6 0	6 11	5 13

Thus it is seen that while in the Madras³ Presidency the highest prices ruled in the Kurnool district, and ranged from—

s. c.	
5 5 -	- in August 1877
to 5 0 -	- in Sept. and Dec 1877
and 4 11 -	- in July 1877.

In the Bombay Presidency the highest prices were—

s. c.	
- 4 11	during August 1877
- 3 9	„ July „
- 3 10	„ August „
- 4 1	„ September „
- 4 6	„ July and Sept. 1877
- 4 3	„ August 1877

And in the Mysore Province they were—

s. c.	
- 4 3	during August 1877
- 4 9	„ September „
- 4 3	„ July „
- 4 2	„ August and Sept. 1877
- 3 14	„ July 1877
- 4 0	„ August „
- 4 1	„ September „
- 4 2	„ July and August 1877
- 4 5	„ September „
- 4 6	„ July „
- 4 2	„ August „
- 3 11	„ September „

As regards *big millet* and *lesser millet*, a statement similar to the above will perhaps be sufficient for all practical purposes.

PRICES OF BIG MILLET.

DATES.	MADRAS PRESIDENCY.						BOMBAY PRESIDENCY.					MYSORE PROVINCE.					
	Cuddapah.	Bellary.	Kurnool.	Madras Town.	Salem.	South Arcot.	Ahmednagar.	Poona.	Sholapore.	Kaladgi.	Dharwar.	Bangalore.	Tumkur.	Mysore.	Kadur.	Chitaldroog.	Hassan.
August 1876	19 0	18 18	22 6	17 12	19 12	20 2	26 4	16 10	22 14	23 0	22 9	16 3	12 8	10 2	—	14 0	—
January 1877	7 9	8 1	7 5	9 0	9 5	—	13 4	11 6	9 14	7 15	9 3	9 4	11 11	7 15	—	7 2	—
March „	9 5	9 5	8 9	11 11	8 7	—	11 13	11 15	9 15	7 6	10 2	9 5	8 0	8 6	—	6 15	—
April „	8 14	8 11	8 2	10 13	8 11	—	11 11	10 14	8 10	6 2	8 11	9 6	7 13	8 12	—	6 11	—
July „	7 0	6 3	5 6	8 8	5 13	—	8 8	7 1	6 11	4 2	4 13	6 7	5 5	6 0	—	5 2	—
August „	7 11	5 1	5 5	7 10	5 14	—	6 1	6 2	5 3	4 0	5 2	6 5	5 10	5 12	—	4 11	—
September „	7 3	7 2	5 6	7 10	5 13	—	6 5	8 7	6 14	5 7	6 7	6 5	6 8	5 6	6 5	—	5 0
December „	9 5	8 2	9 12	11 2	9 5	—	11 12	10 14	9 4	11 6	17 8	10 4	9 2	9 3	9 0	13 6	7 3

¹ After having been at 12-0 and 13-2 in October and November.

PRICES OF LESSER MILLET.

DATES.	MADEAS PRESIDENCY.						BOMBAY PRESIDENCY.					MYSORE PROVINCE.							
	Cuddapah.	Bellary.	Kurnool.	Madras Town.	Salem.	South Arcot.	Ahmednagar.	Poona.	Sholapore.	Kaladgi.	Dharwar.	Bangalore.	Tumkur.	Mysore.	Kadur.	Chitaldroog.	Hassan.	Secunderabad.	
	S. C.	S. C.	S. C.	S. C.	S. C.	S. C.	S. C.	S. C.	S. C.	S. C.	S. C.	S. C.	S. C.	S. C.	S. C.	S. C.	S. C.	S. C.	
August 1876	21 14	17 4	23 2	19 3	21 0	23 4	—	—	—	—	26 0	18 2	18 8	14 14	14 0	14 8	15 16	—	
January 1877	8 2	8 6	7 12	9 4	9 0	10 5	—	—	—	—	11 12	8 11	7 4	8 12	7 8	7 8	8 2	11 11	
March "	10 5	10 4	9 0	11 3	8 9	10 12	—	—	—	—	11 10	9 3	8 0	8 11	7 0	7 10	7 14	14 5	
April "	9 10	9 4	8 10	10 11	9 0	11 14	—	—	—	—	9 12	9 11	8 2	9 2	7 0	8 0	7 11	12 10	
July "	7 11	7 3	6 1	8 0	6 1	8 0	—	—	—	—	6 5	6 11	5 12	5 8	4 13	6 5	5 3	9 5	
August "	6 14	6 4	6 1	7 3	6 1	8 3	—	—	—	—	6 1	6 3	6 0	5 4	4 5	5 2	4 12	—	
September "	6 12	7 8	6 4	8 1	6 1	7 12	—	—	—	—	7 3	6 2	5 13	5 2	5 2	6 8	5 9	—	
December "	12 10	11 14	14 2	10 7	9 10	11 12	—	—	—	—	19 2	9 5	8 11	8 9	9 10	14 0	7 3	9 15	

The first of these two statements shows that in the Madras Presidency the prices of *big millet* were dearest in the Bellary District, where they were quoted at 5-1 in August 1877.

In the Bombay Presidency they were quoted—

In Kaladgi at { s. c.
4 2 in July 1877
4 0 in August "
And in Dharwar { 4 13 in July "
at - - { 5 2 in August "

In the Mysore Province they were—

In Chitaldroog - { s. c.
5 2 in July "
4 11 in August "
„ Hassan - { 4 8 in "
5 0 in September "

Of the *lesser millet* the highest prices were as follows:—

In Madras Presidency—

In Kurnool at - s. c.
6 1 in July and Aug. 1877
„ Salem at - 6 1 in „ „ and Sept. 1877
In the Bombay Presidency it was not quoted any-

where except in the Dharwar District, where the highest price was 6-1 in August.

In the Mysore Province the highest prices were—

In Tumkur - { s. c.
5 12 in July
5 13 in September
„ Mysore - { 5 8 in July
5 4 in August
5 2 in September
„ Kadur - { 4 13 in July
4 5 in August
5 2 in September
„ Chitaldroog - { 5 5 in July
5 2 in August
5 3 in July
„ Hassan - { 4 12 in August
5 9 in September

On the whole it may be safely said that, so far as prices are a trustworthy test of the severity of the scarcity, it was less severe in Madras than in parts of Bombay and Mysore.

L. L.—7th February 1878.
S. C. B.—20th „ „

XIV.—DEVELOPMENT OF TRADE AND INDUSTRY.

MEMORANDUM BY MR. H. S. CUNNINGHAM.

1. India is described in the last Financial Resolution of the Government of India as "a country of unbounded material resources," "capable of producing almost every article required for the use of man;" at the same time, it is observed, such is the primitive condition of society, the poverty of the people, the undeveloped state of trade, that, whereas in the United Kingdom, the value of imports and exports taken together is 20l. per head of the population, in India it is only 10s. $\frac{1}{2}$, i.e., $\frac{1}{40}$ th. The customs revenue (wine, spirits, tea, tobacco) in the United Kingdom is 10s. per head; in India, on a long schedule of dutiable goods, it is only about 3d., again about $\frac{1}{40}$ th.

2. On the other hand India has shown extraordinary capacity for commercial development in various directions, in fact almost wherever an opening has been given. To take a familiar instance, the earnings of Guaranteed Railways increased in the five years from 1872-73 to 1877-78 from $7\frac{1}{2}$ millions in 1872 to 13 millions in 1878. So again great export trades have sprung into existence and flourish with a vigour that encourages the hope that a still more extensive commercial development may be attainable. For instance, wheat sprung from 775,000l. in 1875 to 2,700,000l. in 1877; tea has risen from 192,000l. in 1861 to 2,790,000 in 1877; seeds from $\frac{1}{2}$ a million in 1861 to $6\frac{1}{2}$ millions in 1877-78; coffee from 84,000 in 1861 to $1\frac{1}{2}$ millions in 1876; cotton from $3\frac{1}{2}$ millions to $13\frac{1}{2}$, and we now have an export trade of cotton goods amounting to $1\frac{1}{2}$ millions. In the same way Indian imports from the United Kingdom have risen from $8\frac{1}{2}$ millions in 1850-51 to $30\frac{1}{2}$ millions in 1875-76. Exports to United Kingdom have risen from 8 millions in 1850-51 to 28 millions in 1875, and total imports from 6 millions in 1854 to 44 millions in 1875.

3. To turn to another symptom of activity, there have been since 1861 no less than 800 joint stock companies formed in India; of these 194 are banks, 37 insurance companies, 152 mills and presses, 147 planting companies, 183 trading companies. Such a movement implies considerable commercial activity and a large amount of capital thrown into industrial enterprise.

4. On the whole the figures seem to indicate the possibility of a development of trade, if properly encouraged, on a scale greater than anything attained, and which may completely alter the industrial character of the country. Suppose, for instance, that India becomes capable of manufacturing the 17 millions

worth of cotton goods which she now imports (which seems to be more than probable), this would not only affect the wage-rate throughout the country, but sensibly affect the balance of trade, exchange, &c.; and it is, it seems to me, to changes such as this that we must look for any general improvement in the condition of the poorer classes.

5. In dealing with the question, therefore, how famines can best be prevented and alleviated, the development of trade and the possibility of new industries must occupy a prominent place, and we ought to be able to state with all the certainty of which the subject admits, what are, in the opinion of people who know about such things and whose business it is to judge of their future, the prospects of different trades, and whether there are any trades which, though possibly not strong enough to grow of themselves, might be fostered by Government into a lusty youth, as has been the case with railways. For instance, large tracts of country in Southern India abound in iron ore. Various efforts to utilize it have been made, and have failed from one cause or another; but it is by no means certain that if Government took up the matter with all the resources at its command, this all important industry might not be developed. So again as to Mr. Buck's experiments in tobacco. According to him it is one of the most remunerative crops in the world, the demand for tobacco is unlimited, and the trade may become of the greatest importance.

6. No question on this subject has been asked in our interrogatories, and it is possible that the information we require will be better obtained by a reference to a few Commercial Bodies, the Chambers of Commerce, &c., and gentlemen of mercantile experience, than by sending the questions round to the several administrations. I wish, therefore, to bring this subject to the consideration of the Commission, and to beg each of our colleagues to express his views on it, and to take such steps as he considers proper, for ascertaining what are the possibilities of undeveloped trades and manufactures in the province with which he is immediately concerned, how such trades would be likely to affect the labouring classes, and whether there are any industries which might with advantage receive direct assistance from Government until they attain maturity.

H. S. C.

10th October 1878.

REPLY OF THE BOMBAY CHAMBER OF COMMERCE.

CHAMBER OF COMMERCE,
Bombay, 9th May 1879.

SIR,—The Chamber of Commerce has had under consideration your Memorandum, dated 10th October last, and it has now the honour to submit its views on the subjects therein set forth.

The Chamber concurs in the main in the description of India, in the Financial Resolution of the Government of India, that it is a country of unbounded material resources, capable of producing almost every article required for the use of man; but that such is the primitive condition of society, the poverty of the people and the undeveloped state of trade, that, whereas in the United Kingdom, the value of imports and exports taken together is 20l. per head of the population, in India it is only 10s. or one-fortieth. The Chamber believes that this state of things is chiefly, if not entirely, attributable to the still lamentably defective state of the internal communications of the country.

During the last forty years, the Chamber has never ceased to urge upon Government the supreme importance of this question, being convinced that there is no other that bears so strongly upon the interests of commerce, and perhaps no other material question in which are so intimately bound up the moral and material welfare of the people and the best interests of humanity.

The value of the export and import trade per head of the population of the United Kingdom compared with that of India, will occasion little surprise when the comparative position of India in regard to railways and roads is considered. The United Kingdom, with an area of 122,550 square miles, has 16,872 miles of railway open for traffic, and the country throughout is intersected with roads. British India, on the other hand, with an area of 1,481,866 square miles, has only 7,326 miles of railway, and is so destitute of roads that many thousands of tons of produce are allowed to rot yearly in the fields, there being no way by which they can be brought to market. Nevertheless, the exports and imports of British India taken together, and including treasure, have increased from 38,422,100l. in 1853, when the construction of railways in India commenced, to 113,919,018l. in 1877.

The Chamber, however, considers it important to subjoin the following statement of the annual value of the export and import trade of India during those years, as the figures prove that every increase of facilities for trade in India has been attended with an increased demand for articles of European produce. This information appears to be the more desirable, as we have yet to a great extent to learn the value of the interchange which may be established with people beyond our present frontier, and which is yearly and rapidly increasing.

D d 2

EXPORTS.

Year.	Total Miles of Railway opened.	Merchandise.	Treasure.	Merchandise and Treasure.
		£	£	£
1852-53	21½	20,464,633	1,055,229	21,519,862
1853-54	72	19,295,139	1,483,296	20,778,435
1854-55	171	18,927,222	1,267,033	20,194,255
1855-56	274½	23,040,000	601,177	23,641,177
1856-57	289½	25,340,000	1,253,426	26,593,426
1857-58	430½	27,460,000	822,438	28,282,438
1858-59	625	29,860,000	669,427	30,529,427
1859-60	836½	27,960,000	929,007	28,889,007
1860-61	1,581½	32,970,000	1,119,549	34,089,549
1861-62	2,351½	36,320,000	683,355	37,003,355
1862-63	2,516½	*47,860,000	1,111,140	48,971,140
1863-64	2,962½	*65,625,000	1,270,435	66,895,435
1864-65	3,368½	*68,025,000	1,444,775	69,469,775
1865-66	3,568	*65,490,000	2,165,352	67,655,352
1866-67	3,936½	41,860,000	2,431,503	44,291,503
1867-68	4,016½	50,875,000	1,571,946	52,446,946
1868-69	4,261	53,060,000	1,395,580	54,455,580
1869-70	4,766	52,470,000	1,042,353	53,512,353
1870-71	5,072	55,335,000	2,220,765	57,555,765
1871-72	5,365½	53,190,000	1,495,642	54,685,642
1872-73	5,671½	55,230,000	1,308,579	56,538,579
1873-74	6,201	54,980,000	1,958,512	56,938,519
1874-75	6,497½	56,360,000	1,625,309	57,985,309
1875-76	6,949½	56,210,000	2,200,236	58,410,236
1876-77	7,326½	61,013,000	4,029,898	65,042,898

* Exports abnormally high owing to the American Civil War.

IMPORTS.

Year.	Total Miles of Railway opened.	Merchandise.	Treasure.	Merchandise and Treasure.
		£	£	£
1852-53	21½	10,070,861	6,831,377	16,902,238
1853-54	72	10,070,863	4,871,956	14,942,819
1854-55	171	12,742,671	2,028,256	14,770,927
1855-56	274½	13,945,000	11,301,288	25,246,288
1856-57	289½	14,195,000	14,413,697	28,608,697
1857-58	430½	15,275,000	15,815,436	31,090,436
1858-59	625	21,730,000	12,817,071	34,547,071
1859-60	836½	24,265,000	16,356,963	40,621,963
1860-61	1,581½	23,495,000	10,677,077	34,172,077
1861-62	2,351½	22,320,000	14,951,985	37,271,985
1862-63	2,516½	22,630,000	20,508,967	43,138,967
1863-64	2,962½	27,145,000	22,962,581	50,107,581
1864-65	3,368½	28,150,000	21,363,325	49,513,325
1865-66	3,568	29,600,000	29,537,301	59,137,301
1866-67	3,936½	29,040,000	13,236,905	42,276,905
1867-68	4,016½	35,705,000	11,775,374	47,480,374
1868-69	4,261	35,990,000	15,155,954	51,145,954
1869-70	4,766	32,925,000	13,954,807	46,879,807
1870-71	5,072	31,470,000	5,441,823	36,911,823
1871-72	5,365½	32,090,000	11,573,813	43,663,813
1872-73	5,671½	31,875,000	4,556,585	36,431,585
1873-74	6,201	33,835,000	5,792,534	39,627,534
1874-75	6,497½	36,220,000	8,141,047	44,361,047
1875-76	6,949½	38,515,000	5,300,722	43,815,722
1876-77	7,326½	37,440,000	11,436,120	48,876,120

Satisfactory, however, as the annual progress has been in the export and import trade of India, with the limited lengths of line open, the development has been most marked in those provinces where, under a liberal system of management, the railway charges have been made sufficiently low to encourage trade. One of the principal objects of the Government in sanctioning the construction of railways in India was the multiplication of produce, and the consequent increase of the national wealth, but this beneficent object is defeated if the railway rates for the carriage of goods are fixed on a high scale. The only through communication which we have had with Northern India is that which the G. I. P. Railway affords; but the high rates charged by that company for the conveyance of goods have prevented Western India from reaping all the benefits which were reasonably expected to flow from the introduction of the G. I. P. system into this Presidency. This statement is borne out by the fact that, on a recent occasion, when a reduction of their grain rates was made, a very large development of traffic immediately

occurred and has steadily progressed. In September 1875, the G. I. P. Railway reduced their grain rates from the producing districts in the Central Provinces to 5½ pies per ton per mile, being a reduction of about 30 per cent. on their previous rates. This reduction left the rates still considerably higher than the E. I. Railway Company's rates, but it led at once to a very great increase in the traffic. In the year 1872-73 the quantity of wheat exported from Bombay was 74,867 cwts.; in 1873-74 it rose, with the repeal of the export duty, to 434,453 cwts.; in 1874-75, the export was 633,681 cwts.; in 1875-76, 837,860 cwts.; in 1876-77, 1,234,094 cwts., and in 1877-78, 1,159,443 cwts. The effect of reduced charges on seeds was still more remarkable. In August 1875, the export duty on seeds was abolished, and about the same time the G. I. P. Railway Company's rate for the carriage of seeds was reduced. During the six months ending 31st March 1876, the quantity of the three principal descriptions exported, namely, linseed, rapeseed, and teelseed rose to the large total of 1,559,369 cwts. against 592,373 cwts. exported in the corresponding period of the previous year. The total exports of seeds from Bombay subsequently showed no falling off; in 1876-77 they amounted to 2,754,922, and in 1877-78 to 3,179,475 cwts., and it should be borne in mind that the exports of grain from Western India in the year 1876-77 and 1877-78 were greatly curtailed by the short crops of those years, and by the carrying power of the railways being monopolized by Government for the conveyance of food-grain to the famine-stricken districts of Southern India. The G. I. P. Railway Company's rates are still much too high and a further reduction would, the Chamber believes, result in a yet greater expansion of the export trade. But these illustrations of the effect of reduced rates prove that even railways in India may be of little avail in fully developing the resources of the country, if the rates for the carriage of produce are not reduced to the low scale necessary to attract the produce of the districts through which they pass.

A glance at the map is sufficient to bring home the fact how ill-provided with railways India is in comparison with other countries with which she has to compete for the prospects of attaining any great degree of material prosperity.

Of the lines of railway communication which would benefit not only the export trade of India, but the general trade of India and of England, the one which precedes all others in importance is the line between Ahmedabad and Delhi, which will form part of the great trunk line between Bombay and Delhi, and should be made throughout on the standard 5 feet 6 inch gauge. For it is certain that not only will the local traffic of the line be heavy, but that the natural advantages which Bombay possesses, in being at once the port nearest to the great producing districts of upper India and to England, will draw to it, in the interests alike of producer and consumer, a great portion of the export trade of British India. The total exports of wheat from British India amounted in the year 1874-75 to 1,069,076 cwts., in 1875-76 to 2,498,185 cwts., in 1876-77 to 5,583,335 cwts., and in 1877-78 to 6,340,150 cwts., and there has also been a great increase in the exports of linseed, rapeseed, and teelseed. Now when the line is opened right through to Delhi, Bombay will be really a much shorter distance from Delhi than Calcutta now is, while the distance from Delhi to Bombay, *via* Ajmere and Ahmedabad, will, as compared with the Jubbulpore and Allahabad route, be lessened by about 350 miles. These great natural advantages will, it cannot be doubted, bring to this port a large proportion of the grain exported from British India, and will consequently promote in a material degree the prosperity of this Presidency; but those advantages will, to a great extent, be done away by the introduction of a break of gauge. If grain coming down from the Punjab, beyond Delhi, is to break bulk at Delhi, and then again at Ajmere or Ahmedabad, the great expense, delay, and risks of injury and loss of goods, caused by such double break of bulk, will be a serious impediment to the trade of this port.

The mercantile community of Western India have repeatedly endeavoured to impress upon Government the fact that the opening of a uniform gauge from Bombay to Delhi would have the most beneficial effect on the export trade of this country, and that no other than the standard 5 feet 6 inch gauge would be equal to the requirements of the traffic on this great trunk line. The line at its northern terminus at Delhi will be connected with the broad gauge system of the East India Railway, and at Ahmedabad towards the south-west

with the broad gauge system of the B. B. and C. I. Railway: yet the Government of India persists in sacrificing the permanent trading interests of the country to the opinions of a few advocates of the narrow gauge who have but a temporary and indirect interest in the question, as, indeed, they have in the country itself, by laying the permanent way of the intervening section, that is to say, between Delhi and Ahmedabad, on the metre gauge. The mercantile community believe that the evils of the break of gauge will be found in practice to be intolerable, that the portion of the line between Ajmere and Delhi, which is already made on the narrow gauge, must ere long, at heavy extra outlay, be reconstructed on the broad gauge, as the metre gauge will be found unequal to the traffic, and that the construction of the line south of Ajmere on the narrow gauge, will, therefore, be a needless waste of public money, and a serious injury to the trading interests of this Presidency and of Upper India. The Chamber therefore recommends that the work of reconstruction should be proceeded with at once, and that the line between Bombay and Delhi should be completed on the standard gauge, and with the utmost practicable expedition.

A great deal of the suffering and loss from famines of late years which have to be deplored would almost certainly have been averted if Government had, with more vigour, followed the example of America, and of most European countries, by forming lines of communication. The famine of 1869, in Rajputana, resulted in the loss of about one and a half million of lives from starvation; the loss of cattle was so great that the Governor-General's Agent estimated that one-half of the usual area could not be sown; a large portion of the population emigrated, and many thousands of them were supported in the poor houses in the Ajmere and Mhairwarra districts, and at Neemuch and Anadra. The Commission will readily perceive how much of the distress and privation then undergone would, with railway communication, have been prevented; as it was, while Rajputana was stricken with a terrible famine, wheat, jowar, and other food-grain abounded in Guzerat, but were almost wholly unavailable, there being no means of transporting them speedily to the suffering districts.

Next in importance to the early completion of the trunk line between Bombay and Delhi on the standard gauge, are the railways required for the development of the great producing districts of Central India.

Nearly all the wheat and seeds exported from Bombay—and the trade in these has, as already mentioned, increased largely in recent years—come from the producing districts in Central India, and it is universally admitted that the extension of railways throughout those districts, combined with a low scale of railway charges for the conveyance of produce to this port, would still further enormously develop the great export trade in these articles. Railway communication in the Central Provinces extends only to Nagpore, the G. I. P. Company's terminus. The construction of a railway from Nagpore eastward towards Chhattisgarh has for several years been under the consideration of the Government of India. Last year, the extension of the railway from Nagpore to Raipore was sanctioned, but the Chamber regretted that it was proposed that the line should be constructed on the narrow gauge. The line will open up the greater part of Chhattisgarh, the most populous portion of the Central Provinces, in which all kinds of agricultural produce are raised in superabundant quantities, but in which development is at a standstill for want of the means of transport. Not only will a heavy traffic in grain and seeds flow to it from the surrounding districts, but the line will eventually form a part of the main through line of communication between Calcutta and Bombay, for the line when extended from Nagpore to Calcutta will, while intersecting the richest provinces in India, shorten the distance between the capital and this port by 200 to 300 miles. Narrow gauge lines may be well adapted for the branches of trunk lines and for local lines on which the traffic is inconsiderable. Experience, however, has already proved that the difference in the first cost of broad and narrow gauge railways is insignificant, and that the cost of working a railway on the narrow gauge, where there is a heavy traffic, is much greater than the cost of working one on the broad gauge; and it is impossible to exaggerate the injury that will be done to the permanent trading interests of the country by introducing breaks of gauge into the great trunk lines of India, such for instance as the line between Bombay and Delhi, and the line from Nagpore to Raipore. It has been repeatedly urged on

Government that trunk lines should throughout be constructed on a uniform gauge, and that those portions of great trunk lines which are made on the narrow gauge will at no distant date have to be reconstructed on the broad gauge, at great loss to the country, when the through communication is completed. It is obvious that the impediments, caused by the introduction of breaks of gauge on main through lines, will be a great hindrance to the export trade, and the Commission would render an important service towards developing that trade by their strongly urging upon Government the construction of the line from Nagpore to Raipore and eastwards on the broad gauge, and the immediate reconstruction on the broad gauge of such portions of the line between Bombay and Delhi as have been made on the narrow gauge.

The early completion of the line from Nagpore to Raipore on the broad gauge, and its extension on the same gauge to Sambalpoore, would be of inestimable value to India, for there is no line which could, when the quantity and the bulky nature of its traffic are considered, require the greater capacity of the broad gauge more than this; nor is there any line, with the exception of the Bombay and Delhi line, which would in a greater degree stimulate and augment the grain trade of India. The producing districts through which the line from Nagpore to Sambalpoore would pass are described as the granary of India, but, great as the value of that line would be in opening these fertile districts up, the full development of their export capabilities could only be accomplished by the introduction of additional cheap tributary lines and roads serving as feeders to this main line. The financial success of such a scheme is assured by the great fertility of the districts; and no other scheme could be devised better calculated to increase the exports of India, and to materially affect the well-being of the people and the consequent prosperity of the imperial revenue. Year after year the importance of opening up these districts has been laid before the Government of India. Their development would be followed by the happiest results to the moral and material advancement of the people, and the agricultural statistics of the provinces indicate the vast scale which this development might reach. In the statement exhibiting the moral and material progress and condition of India during the year 1872-73, (presented to both houses pursuant to Act of Parliament) page 26, the area of the Central Provinces is stated to be 36,046,250 acres, of which a little less than a third was cultivated, and about another third was cultivable. In the Report, however, on the Trade and Resources of the Central Provinces for the year 1876-77, by the Chief Commissioner, we find that (page 11) the total area under cultivation (not including that of the Sambalpoore district not previously stated) was about 14½ millions of acres, leaving 11½ millions of acres of cultivated land still uncultivated. Now the total export of wheat and seeds from Bombay in the year ending 31st March 1878 was 4,288,268 cwts., nearly all of which was the produce of the Central Provinces. This export was nearly three times greater than that in the year ending 31st March 1875, and it is reasonable to suppose that if the provinces were thoroughly opened up by lines of railways and of roads the 11½ millions of acres would soon in those fertile provinces be brought under cultivation and the export of produce nearly doubled.

Notwithstanding the urgency and the paying capabilities of a line of railway from Nagpore to Sambalpoore, the Government of India has at length accorded a reluctant sanction to the construction of a portion of it only, namely, to Raipore, and that too on the narrow gauge. The Chamber has no information as to what progress, if any, has been made on this much-needed line. And its pressing necessity which has been repeatedly urged on the Government of India, will be brought home to the Commission by the following extract from the Chief Commissioner's Report on the Trade and Resources of the Central Provinces for the year 1876-77, (pages 5, 6, and 7) viz.:—

"8. From the railway terminus at Nagpore a proposal has been several years under consideration for constructing a railway eastward towards Chhattisgarh where wheat, rice, and all agricultural produce are raised in superabundant quantities, so much so that Chhattisgarh is popularly styled the granary of this part of India. The project has received the approval of the Secretary of State and the Government of India, and during the year under review a party of Engineers took up the final surveys of the whole line to Kallianpoore near Raipore, 121½ miles in length. This work was completed, but as the Government of India have not yet finally

" decided on the gauge to be adopted the necessary calculations to the preparation of plans and estimates are in abeyance, and the famine interfering the engineering staff was dispersed early in the present year. Thus a further postponement of this very important project has become inevitable. The gauge to be adopted on this line is certainly a primary consideration as were it ultimately to be prolonged to touch the open line any where about Ranigunj its character as the shortest communication between Bombay and Calcutta would be enhanced very materially. It was decided, however, during the year to explore the country beyond the proposed terminus near Raipore in the direction of Sambalpoore in the extreme east of the province bordering on the tributary Mehals of Bengal, and an experienced engineer and staff were deputed to carry out this work.

" Three routes were suggested—(1) from the terminus *via* Bilaspore to Korba, (2), from the terminus to Bilaspore and thence by a route generally parallel to the course of the river Mahanadi to a point on its left bank near Sambalpoore, and (3), from the terminus *via* Raipore to Sambalpoore direct. The three routes were 220 miles, 154 miles, and 120 miles respectively, the shortest being the direct one due east *via* Raipore and Sambalpoore. The report of these rough surveys was placed before the Government of India with a Minute from myself on the relative merits of each and the effects each would have on the trade and general prospects of the country. There is no pressing necessity for this extension of the line such as there is for the line to Chhattisgarh. Almost half the population of the Central Provinces are here as it were locked up beyond reach of any market for their surplus agricultural produce. From all parts of Chhattisgarh wheat, rice, linseed, &c. are brought over long distances to Dongargarh (or Kallhanpore), 121 miles from Nagpore, and there sold off at fabulously low prices to the Native dealers or agents from Nagpore and Kamptee, from Berar, and latterly from Bombay itself.

" From Dongargarh to Nagpore the produce is carried on carts along the 'Eastern Road,' each cart carrying about a ton, and costing at the most favourable rate prevailing about as much as the railway freight to Bombay above 500 miles. Development in Chhattisgarh is at a standstill for want of this short length of railway. The means of transport by cart and pack bullock is not equal to the demand, and notwithstanding that the existence of a metalled road now makes two and sometimes three trips in the fair weather possible, a run of a few good seasons in Chhattisgarh is as much dreaded by the agriculturist as a failure of the crops, for his produce is then a drug in the market, and he must sell at any price for money to pay the rent of his land. I need say no more in this place on the urgency and importance of this Chhattisgarh line of railway as the Government of India are in possession of the fullest and most recent information on the subject, and I deeply regret that financial considerations should again necessitate its postponement for a time."

The completion of the line between Bombay and Delhi, and of the railway from Nagpore to Sambalpoore, both on the broad gauge, and the opening up at the same time of the Central Provinces by a number of cheap lines and roads communicating with the main line of railway, are of the first importance in developing the resources of Western India. Numerous other lines, however, are urgently needed, among which the Chamber would mention as of great importance a line from Anund on the B. B. and C. I. Railway into Kattyawar which is yet all but wholly unopened, and a line from Anund eastward to Rutlam. Another line of great importance is a railway from Deeksal or Sholapore or some point on the G. I. P. Railway to Hubli or some central point in the Dharwar cotton field. But it may be said that there is hardly a province in Western India, as indeed of all India, whose development is not retarded or at a stand-still from the entire want of railway communication.

To those who are familiar with India, it is apparent that good roads are almost as much wanted as railways, and that the extension of roads would tend greatly to assist the inland traffic. It was not, however, till 1845 that the systematic construction of roads in any part of India was commenced. The Chamber has been unable to ascertain the exact length of roads which has since been constructed in India, but it believes that the total length in the whole of British India probably does not

exceed 50,000 miles, while England, with an area of 50,000 square miles, has perhaps 130,000 miles of public highway and macadamized roads.

The Chamber deems it unnecessary to occupy the time of the Commission with general arguments in favour of the facilities of transit and communication which are so much wanting in India. The advantages to mankind of railways, and of roads, upon which they can pass at all times with comfort and celerity, can hardly be appreciated too highly, and if, as has been said upon the highest authority at home, the more general introduction of highways into Scotland in the beginning of this century advanced civilization in the districts principally affected by at least one hundred years, and if the effects of the opening of new roads in Ireland still more recently have been spoken of as magical, as well in a moral and social as in a commercial point of view, what might not be expected from like causes in a vast continent, almost destitute of water communication, and of which the need of roads is in consequence so much more urgent. It is a fact about which no difference of opinion can exist that the trade of India is still small beyond comparison with that of any country so populous and so capable of trade; and that little progress has yet been made towards developing the vast resources of this empire. If it is intended that this field should ever be harvested, the means of making its riches available must be provided. So long as we find it stated, with regard to the producing districts of Central India, that but little more than a third of the land is under cultivation, and that even under such circumstances, in years of abundance, the more perishable descriptions of produce cease to have almost any value, indeed are often left to perish on the field from the want of outlet by roads, we can look for but little progress in this direction. So long as such a state of things is permitted to exist, it is impossible for the ryot to better his condition; he must remain as at present without incentive to exertion, and with difficulty able to provide the scanty means of supporting existence from day to day. It is thus that we are enabled to account for the oppressive nature of a land tax, which, as a rule, is in itself light beyond example, and which, though averaging only a small sum per acre on cultivated land throughout this Presidency, yet absorbs in that sum a very large portion of the returns from cultivation.

To the want of railways and of roads, then, do the Chamber mainly attribute the depressed state of the country, and the still limited nature of our export trade from Bombay as compared with what might be expected from the only great outlet of so vast a tract of continent. And equal at least in degree are the effects of the same cause upon our import trade, as will be seen from a comparison of the export of British manufactures to India per head of the population, with the exports to South America and the Australian Colonies.

While on the subject of inland communications, the Chamber, although preferring railways to canals, cannot overlook the fact that the great waterways of the Godavery, Kistna, and many other rivers, could be used to immense advantage; and they respectfully recommend that all information on projects for irrigation should be published. They commend to the attention of the Commission the project for irrigation from the Taptee river on which years have been spent on surveys and reports, but on which no work has been done. Captain Osborn Chambers, in his report on irrigation from the Taptee river, dated Surul, 1st October 1860 (*vide* Selections from the Records of the Bombay Government No. LXL, new series), concluded that there was water enough in the river for at least 200,000 acres of land, from the middle of June to the 1st of December, if not longer; that there were on both banks of the river 200,000 acres of land so situated as to be perfectly irrigable: that a return of 8 per cent. on the proposed outlay of 36½ lakhs might confidently be anticipated; and that the works would greatly benefit and enrich the district. It might be that public companies could work such projects, but then the system of Government competition should be for good abandoned, and the care of Government should be to foster, protect, and encourage private enterprises of this description, by which the industrial position of the country would be improved.

In paragraph 3 of the Memorandum it is observed that no less than 800 joint-stock companies have been formed in India since 1861. The Chamber, however, apprehends that many of the companies referred to, such as banks, financial associations, and schemes for the reclamation of land from the sea, were brought out during the share mania in Bombay in 1863 to 1865, and have long since ceased to exist. The fairest mode of comparison,

at least in this Presidency, would be to compare the number of companies and the amount of capital in existence in the year 1861, at the close of which the American Civil War broke out, with those existing in 1878. And, with the exception of the cotton spinning and weaving industry, the comparison is not favourable. In 1861, there were seven banks in Bombay; there are now nine, and of these one is a branch of the *Comptoir d'Escompte de Paris*, and another an agency of the Bank of Bengal. Although numerous branches of English and continental insurance offices have been opened in Bombay, only two local fire offices, two local life offices, and two local marine offices now exist. The policy of the Government of India seems to aim at discouraging the practice of insuring life and property, which pervades the social and commercial systems of England and other enlightened countries. Insurance, particularly on life and against fire, is a practice universally adopted in England, where the rates of premium are very low. But in India, or at least in this Presidency, life insurance is mainly confined to Europeans; and, in many cases, the ordinary high rates of premium chargeable in India put it out of the power of Europeans to insure their lives. The practice of insuring property against fire is almost entirely confined to the Presidency towns, and it is also practically resorted to by Europeans only. The rates of premium on fire insurance in India are also much higher than the rates charged in England, and the Natives seldom care to incur the expense. Yet in the new Stamp Bill, which became law on the 1st of April 1879, life policies, which previously were free, are subjected to a stamp duty of 6 annas per Rs. 1,000, while the stamp duty on fire policies had been increased 50 per cent., that is to say, from 4 annas to 6 annas per Rs. 1,000. Moreover, a tax varying from Rs. 500 to Rs. 1,000 is levied by the Bombay municipality on every fire office as its contribution to the fire brigade. The Chamber considers this tax to be excessive, particularly when it is borne in mind that a very few houses in the native town of Bombay, where fires are of most frequent occurrence, are insured. With the extension of the railway system into the cotton districts, numerous presses have been established at the various marts in the interior, by means of which nearly all the cotton for export comes to Bombay in the form of full-pressed bales, and a large saving in the cost of carriage is consequently effected. Private enterprise soon responded to the requirements of the trade in its altered conditions; but the success which awaited the establishment of presses in the interior, resulted in a proportionate diminution of the prosperity of the same industry at the port. Many of the pressing establishments at Bombay have in recent years disappeared, and very little pressing is likely to be done henceforth in Bombay. There are no planting companies in Bombay, and the numerous trading companies, which flourished during the American War and a year or two subsequently, have long since passed away.

But there is one industry—that of cotton spinning and weaving—which, in spite of many hindrances and reverses, such, for instance, as the high price of cotton during the American War and for some years later, and the depression of trade resulting from successive years of famine and short crops, has taken root in this Presidency. The erection of the first cotton spinning mill in Bombay commenced in 1854, and there are now 32 mills. The paid-up capital of these mills is 3,808,543*l*. The number of spindles at work is 955,846, and of looms 10,266; and they give employment to 27,000 hands. In addition to these mills there are 11 cotton spinning and weaving mills up-country, having a paid-up capital of 784,487*l*.; in these up-country mills there are about 179,500 spindles and 1,828 looms at work; and about 6,000 people are employed in them. Except in the years 1874 to 1876, during which there was a very good demand for the local manufactures, this industry has not prospered, but employment in the mills is much prized by the working classes. The operatives—men, women, and children—are nearly all paid by piece-work, and the earnings of each vary from Rs. 7 to Rs. 40 per month. It is the duty of the Government to encourage this industry to the utmost possible extent, and, except in granting concessions, at nominal rates, of land for sites for new factories, and of water, whether to be used for driving power or for working the mills, the Chamber believes that Government cannot encourage it more effectually than by abstaining from all interference with its internal working.

Having now referred to the wants of the country as affecting the development of its trade, and to the state of industry, the Chamber would earnestly press the

Commission to urge upon Government the immediate removal of all existing and contemplated restrictions, whether in the form of special enactments or otherwise, which confer no benefit, but, on the contrary, burden trade, and weigh heavily on the springs of industry. The growing tendency of the official classes to interfere with the operations of trade and industry are everywhere manifest, and, unless peremptorily checked, will ere long become an evil of the first magnitude, and greatly impede their development. The Chamber will here enumerate the more burdensome and vexatious of these restrictions, which, it considers, should be abolished.

An Act called The Bombay Cotton Frauds Act was passed in 1863, in a time of great excitement, when, owing to the American Civil War, the price of Indian cotton rose from 4*d*. or 5*d*. to 18*d*. or 20*d*. per lb.; and much adulterated cotton was in consequence sent forward. The exceptional state of thing which led to the introduction of this special Act passed away, however, soon after the war was brought to a close and the trade had settled down. Railway and telegraphic communication was extended throughout the cotton districts, enabling the European merchant to establish direct business relations in the interior of the country with the Native producer; and an improvement in the quality of Indian cotton was soon observable, which the Chamber believes to be of a permanent character. The Chamber has again and again represented to Government that many years have elapsed since the Act conferred any benefit on the trade, that it is continued solely in the interest of the Cotton Frauds Department, which is maintained by a special tax on the trade, that the improvement which has taken place of late years in the quality of Indian cotton is due, not, as was alleged, to the operation of the Act, but entirely to improved means of communication with the cotton districts, and to private enterprise and the natural operations of the laws of trade: and this is proved by the fact that, while in those districts in which the Act is in force it is completely inoperative, it is principally from those districts where the Act is not in force that really good cotton comes. The Act was, however, re-enacted last year, Bombay Act No. VII. of 1878, in spite of the protests of the mercantile community of Western India, and of the Manchester and Liverpool Chambers of Commerce. The Chamber has recently addressed another memorial to His excellency the Viceroy, praying that the Act be repealed, and that pending the repeal of the Act the full-pressed bales of cotton, coming from districts where no Cotton Frauds Act is in force, through Bombay, in transit for exportation, may be forthwith exempted from the injustice of having to pay the fee of 2 annas per bale in support of the Cotton Frauds Department of the Bombay Presidency, the inspectors connected with which never see, and render no service in return for, the payment of the fees on such cotton. Out of 741,000 bales of cotton exported from Bombay to foreign ports in 1878, about 400,000 bales came full-pressed ready for shipment from the Berars, the Central Provinces, Madras, and Bengal, where no Cotton Frauds Act is in force, but were, nevertheless, subjected to a tax of Rs. 50,000, in order that funds might be obtained to pay the Bombay cotton inspectors; and a large proportion of the remaining 341,000 bales came from Native territory.

Another local Act which, in its operation, has been a grievous hardship to the rising cotton industry of this Presidency, is Bombay Act No. V. of 1873, which renders the periodical inspection of steam boilers and engines used in factories compulsory. This Act is worked in the most arbitrary and vexatious manner. The most objectionable feature in it is the practically uncontrolled authority vested in the inspector, who, at every inspection can, and as a matter of fact does, order the boilers and engines to be unfitted, and the latter to be taken to pieces, thereby stopping the mill for several days, and depriving the hands, whose numbers vary with the size of the mill from 400 to 3,500 persons, of their work. The Commission are doubtless aware that in the United Kingdom no law exists, rendering the inspection of boilers or engines on land compulsory. The object of this kind of legislation is to guard against danger to human life, but it is only from explosions of boilers that accidents dangerous to human life occur; and the Chamber would therefore be unwilling to disturb the Act in so far as it is calculated to prevent such accidents. But the inspection need not necessarily be conducted by a Government inspector. In October 1876, an important trial took place in the High Court of Bombay, at which the oppressive and vexatious manner in which the Act No. V. of 1873 may be worked,

was brought to light. The disclosures made at that trial induced the Chamber to urge upon Government the expediency in the public interests of abolishing the Government establishment for the inspection of boilers. There were many private engineers perfectly competent, who, if appointed or licensed by Government, would be glad for a small fee to inspect the boilers of factories; and the inspection would, the Chamber felt sure, be conducted with equal efficiency and with much greater economy than the present system, while it would have the merit of preventing the hardship and annoyance to which the owners of factories could be subjected.

But there is no ground for State interference in regard to engines or prime-movers. Accidents attended with loss of life or injury to the person, arising from faults of engines, are extremely rare, and a periodical examination, however frequent, will do very little to prevent such accidents as do occur. To examine all the working parts of an engine requires several days in taking the parts to pieces, in examining them, and in again putting them together. The stoppage of a mill for two or three days, or for any period of time, causes heavy loss to the owner, and deprives the hands of their work, and, when the examination which is the cause of this stoppage is unavailing to prevent accidents, the law which sanctions such examinations becomes an oppressive restriction on the industry.

A new Boiler Inspection Bill, No. IX. of 1878, has been published, and will shortly come before the Council of the Governor of Bombay for making Laws and Regulations. In this new Bill it is proposed to repeal so much of the present Act V. of 1873 as relates to the inspection of engines, but to give power to the Governor in Council at any time, by notification in the *Bombay Government Gazette*, to apply to the Act to the inspection of engines in any place or district in which the Act may be at the time in force. It is much to be regretted that Government should still propose to retain this power, and that every allusion to the inspection of engines is not wiped out of the statute book, for if the application of the Act to the inspection of engines should again be enforced, and there is great danger of this in a country where State interference in everything is so much desired by the official classes, it will have the effect of increasing the personal importance of the inspector, of perpetuating the harsh effect of the Act, where its operation is most vexatious, and at the same time totally useless and uncalled for, and of subjecting the factories to additional taxes for the maintenance of the inspector's increased establishment, without conferring any benefit on the public, or the factories in the Presidency, but, on the contrary, subjecting the latter to certain injury and loss. The provisions in the new Bill, particularly those which relate to the inspection of boilers, are arbitrary, and, if exercised by an unscrupulous inspector, would become most oppressive and injurious to the owners of factories. By the present existing law, the inspector's certificate is in force for one year, and no accidents have occurred showing the necessity for this period being reduced; yet, in the new Bill, it is proposed to shorten the period of a certificate to six months. The proposed Bill, moreover, confers new powers of the most arbitrary character on the inspector: section 13 empowers him "at any time" between sunrise and sunset on any day during the "period for which a certificate may have been granted" to examine any boiler for which such certificate has "been granted, in order to ascertain whether such boiler is still in good condition, and whether any cause exists for revoking the said certificate." The Chamber cannot conceive of anything better calculated to strike at the root of any industry than such a law as this. Actuated by caprice, by malice, or for purposes of extortion, the inspector may, with this authority, examine the boilers of a factory weekly or oftener, and stop the factory for several days at each examination.

The industries of India have hitherto been free from the interference of Government with factory labour, and the Chamber regards this exemption as tending to the popularity of factory work among the labouring classes, and to whatever success has fallen to the factories themselves. The Chamber, however, has learned that it is the intention of Government to introduce a Factory Act into India, although the Commission appointed by the Government of Bombay in March 1875, to enquire into the condition of the operatives in the Bombay factories, and the necessity or otherwise for passing a Factory Act, were of opinion that legislation in any shape was unnecessary. The agitation for the introduction of this Act has not arisen from any complaints made to the Local Government, nor has it been

occasioned by any mal-treatment or misery observed among the workpeople. It is of purely English origin. The English Acts, commencing with Lord Althorpe's Act, 3 and 4 Guliel. IV., cap. 103, were under a very different system of working, and in an inclement and rigorous climate, forced upon the Government by considerations of humanity for hardships and suffering which had a real existence, and by the state of public feeling which the operatives themselves excited. On every subsequent occasion when a new Factory Bill was submitted to Parliament, the operatives themselves were the chief promoters of the measure. But no complaints, either with respect to the hours of labour or harsh treatment, have ever been made by the operatives in Indian mills, employment in which, on the contrary, is eagerly sought as the certain means of greatly improving their condition. The mill buildings are well built and well ventilated, and the machinery fairly protected, while the temperature is not much greater inside than it is outside of the mill. No mill in this Presidency is worked before sunrise or after sunset, and the system, which is universal, of paying the hands by piecework, enables them to do their work in an easy and leisurely manner, which contrasts in a marked degree with the steady unremitting labour exacted from an English operative.

In addition to these restrictions, the transit duties levied throughout India, not only in Native territory, but by almost every municipality in British India, on goods passing through their limits, are a serious hindrance to the development of the trade and manufactures of India. The Government of India, in their resolution of the 6th of November 1868, which almost exhausted the whole subject of municipal taxation, laid down certain rules to be adopted by all subordinate Governments and Administrations in the levy of octroi duties. Those rules were—

I. That subject to the limitations contained in Rule II., no town duty or cess under any name should be levied by any municipal body on any commodity not included in the following list, viz. :—

- (1.) Articles of food or drink for men or animals.
- (2.) Animals for slaughter.
- (3.) Articles used for fuel, for lighting, or for washing.
- (4.) Articles used in the construction of buildings.
- (5.) Drugs, gums, spices and perfumes.
- (6.) Tobacco.

II. That no such duty should be levied on any of the following articles, viz. :—

- (1.) Articles liable to Customs duty and imported into India by sea.
- (2.) Salt.
- (3.) Opium.
- (4.) Fermented or spirituous liquors manufactured in India, and drugs liable to Excise or Abkari duty; and

III. That no such duty should be levied except on things brought into a town for actual use or consumption therein.

By the subsequent orders of the Government of India of the 6th of January 1871, the following classes of commodities were added to the list of articles subject to the levy of octroi duties :—

- (1.) Piece-goods and other textile fabrics and manufactured articles of clothing and dress.
- (2.) Metals, and articles of metal, subject, however, to this proviso, that the duty on them did not exceed $1\frac{1}{2}$ per cent. *ad valorem*. But in all other respects, the rules prescribed in the Resolution of November 1868 were re-affirmed in 1871, and again in the letter addressed by the Government of India to the Subordinate Governments in September 1877.

If town duties were confined to the articles here enumerated, and levied at moderate rates, they would, with liberal rules for the granting of refunds on re-exportation of the articles, fall on the consumption of the towns for whose benefit the imposts were levied, and the mercantile community would have little ground for complaint. But the Commission will doubtless be surprised to learn that the excellent rules for municipal taxation prescribed by the Government of India have been deliberately disregarded in this Presidency: duties under the name of octroi are levied on almost every

article which, whether it has borne Customs duty or not, and whether intended for consumption or sale, or for transmission to other places, enters the limits of any municipality. The rule which the Government of India laid down for the granting of refunds on re-exportation has also been deliberately set aside: some of the municipalities allow no refunds whatever, while the rules relating to refunds adopted by others are either so illiberal or so stringent, as to render it almost impossible to obtain a refund, and the octroi consequently degenerates into a transit duty. The Government of India condemned this widespread system of taxation on the ground that it was injurious to the interests on which the burden in a great measure fell, and stood in the way of the proper development of the commerce of the country; but it is of little avail writing able and exhaustive resolutions, if subordinate Governments and Administrations are, as has been the case hitherto, permitted to set these resolutions at defiance.

It is clear that the development of local industries would tend to the improvement of the people and to a rise in the rate of wages. But this must depend on the state of the labour market, for all the wages earned in the manufacture of cotton goods of the value of 17 millions sterling would be small when estimated by the proportion of labourers which must be available in a country containing a population of 240 millions. If such a scale were attained, the balance of trade would be affected to the advantage of India, and would so far tend to support the rate of exchange. If, for example, India, instead of exporting 11,000,000% worth of raw cotton, which is made in England into articles of the value of 17,000,000%, for the use of this country, were to manufacture the cotton herself, she would retain the difference of 6 millions sterling for wages, &c., and would have this amount in her favour when the trade balance was taken. The Chamber is not prepared to say that India will manufacture the whole of her cotton goods for many years to come, if she ever does so; but the foregoing are economic inferences deducible from the data laid down in the Minute.

Private enterprise alone can deal with the manufacturing industries. The exports of Bombay-made grey yarn and goods to China, Japan and other countries have already assumed large proportions; and this has been effected while the mills are in their infancy, without the aid or interference of Government, and in the face of great depression of trade. During the last three years, the total exports by sea, from this port, of local cotton manufactures were as follows:—

	Piece-goods. Yards.	Yarns. lbs.
1876 - -	28,164,000	18,404,740
1877 - -	40,813,671	25,768,131
1878 - -	46,146,469	33,116,349

and during the same period the following were the total quantities of local cotton manufactures sent from Bombay, by railway, to the various railway stations in the interior:—

	Piece-goods. Indian maunds of 82½ lbs.	Yarns. Indian maunds of 82½ lbs.
1876 - -	184,578	89,764
1877 - -	181,232	83,901
1878 - -	187,074	67,761

There are other industries besides the cotton manufactures which would, the Chamber believes, flourish in India. For paper-making, the country seems to be peculiarly well suited, abounding, as it does, in the

chief materials used in the process; while the consumption of paper in India, and the annual importations from abroad, are ever on the increase. The most serious drawback to the introduction of this useful and profitable industry into this Presidency is the difficulty of obtaining adequate supplies of water at cheap rates. The wool manufacture only requires a trial in order to ensure its success. The total quantities of raw wool exported from British India, in the last three years, were as follows:—23,767,692 lbs. in 1876, 24,056,767 lbs. in 1877, and 23,075,323 lbs. in 1878. In Calcutta, the hemp and jute manufacture is being developed successfully; in Bombay, only one manufactory has been established. Two silk mills have also been opened here; and several iron foundries. The establishment in India of such trades as engine-builders, machinists, mill-wrights, &c., would be of great convenience to the Indian mill-owner. He is entirely dependent on England for his machinery, and if, for instance, the cylinder cover of his engine is driven out, he may have to close his mill for several months until a new cover is obtained from England. But none of these industries or trades could be fostered by Government interference into a lusty youth.

The mineral resources of India are very great, in fact almost unbounded. Government might with advantage employ a larger staff of geologists for the exploration of these resources, and should publish all information obtained. The development of these resources must be initiated by Government in districts where mining operations can be conducted with economy. The financial success of these operations cannot be looked forward to as a certainty, but, with strict economy in the working, it is possible that they may be made to pay their way; in which case, it should be made known to capitalists at home that facilities would be offered to any Company formed for the purpose of developing the mineral resources of this vast country.

No doubt the cultivation and manufacture of tobacco is capable of great improvement and development in India; and it is probable that if Government were prepared to incur expense, and to establish agencies in various suitable parts of the country for the growth and manufacture of the article, on the basis of the experience of experts in the same industry in other countries, interesting results and valuable information, which would tend to the development of private industry in the same direction, could be gained. These experiments, however, would perhaps be a failure financially.

In conclusion, the Chamber desires to express its earnest hope that the views above set forth, more particularly in regard to the extension and improvement of lines of internal communication, and to the removal of all restrictions on trade and industry, will receive the careful consideration of the Commission. The Chamber believes that nothing will conduce more to the development of the resources of the country, to the prevention or alleviation of famine, to the increase of trade and manufactures, and to the general improvement in the condition of the agricultural and labouring classes.

We have the honour to be,

Sir,

Your most obedient servants.

M. MOWAT,

Chairman.

J. GORDON,

Secretary.

NOTE BY THE HONOURABLE MORARJI GOKALDAS, C.I.E., ON THE DUTY OF GOVERNMENT IN FOSTERING INDUSTRIES.

I have considered the Memorandum dated the 10th October 1878, and entirely concur in the principles laid down in para. 5 thereof, that, "in dealing with the question how famines can best be prevented and alleviated, the development of trade and the possibilities of new industries, must occupy a prominent place."

2. Indeed, I believe the struggle for existence with the great majority of the middle and lower classes, even under ordinary circumstances, is now-a-days so great that, in my humble opinion, no time should be lost in taking into serious consideration measures calculated to develop trade and create new industries and

manufactures, utilising every possible resource that the country is possessed of, and thus creating a substratum of wealth which alone would enable calamities like the famine to be tided over without great suffering on the part of the people and expenditure from the State funds, followed by harassing taxation.

3. I believe the idea has for some time prevailed that India need only devote her attention to agriculture, and trust to the export of her surplus produce for the rest; and this idea gained strength from the abnormal prices which were temporarily obtained for agricultural produce during the American war. But I do not know if any country has ever flourished on mere agri-

culture, and believe it impossible, in the nature of things, that such should be the case; while the ignorance and poverty of the Indian cultivators, the smallness of their holdings, the uncertainty of the seasons, and the variable nature of our revenue settlements to my mind preclude the hope of very much more being effected in this direction than is done at present, except perhaps under the stimulus of exorbitant prices which cannot be commanded. It seems to me therefore that it is useless to look in this direction for any great relief to or improvement over the present state of things, and that it is on the creation of new industries and manufactures that we must chiefly depend for the objects in view.

4. This part of the question is very moderately put by the writer of the Memorandum under notice, in the shape of an enquiry "whether there are any trades which, though possibly not strong enough to grow of themselves, might be fostered by Government into a lusty youth, as has been the case with railways." The supreme Government admit, in the words quoted by the author of the Memorandum, India to be "a country of unbounded material resources, capable of producing almost every article required for the use of man;" and yet, as a matter of fact, most of the articles required, either for the public service or general use, are imported from abroad. The only local industry which may be said to be general is agriculture, which, from its very nature, can only occupy the energies of one set of people, and must for its success depend on a combination of circumstances not always under control; and, in consequence, a general failure during a single season produces widespread distress, necessitating a vast expenditure of State money to obviate its worst results. The question therefore is, whether Government ought not to aid in the creation or development of industries or manufactures which, utilising the materials and energies not required by agriculture, would place the country in a fair way to general progress, and tend to neutralise the consequences of a failure of crops, and thus render the people, as a body, able to tide over temporary calamities like famine, and save themselves without much assistance from the State.

5. I am aware that the question thus put is likely to suggest a discussion on the principles of free trade and protection; but I do not think that any such discussion is necessary, for I believe the principles of political economy presuppose certain conditions before they can be applied to a given state of society or country, and where these conditions do not exist a deviation from the principles of political economy is not necessarily their violation, and is therefore justifiable. At any rate, this seems to me to be the view which the Government has practically adopted in regard to the construction of railways, which have been instanced in the Memorandum. Strictly speaking, carrying is as much a trade as manufacturing or selling, and if the one business, when not strong enough to grow of itself, is fostered by Government into a lusty youth, in order to promote a certain important public object, there seems to me to be no reason why the other should not be similarly treated if it is calculated to secure an equally important public end. Another and a more recent illustration of the same principle is the action of Government in regard to the carriage of grain during the late famine. Most of the districts afflicted with this calamity were intersected by roads and railways, and private enterprise could be and was trusted to bring about the required amount of supply. A few were out of the lines of communication, and therefore not easily accessible. Here private enterprise was not expected to step in, and so Government arranged to send in the necessary supplies of grain. This apparently diverse action in either case seems equally justifiable under the laws of political economy, if those laws are to be followed as a means to an end, that end being the public welfare, and not to be reversed for their own sake. Now I believe that in the present circumstances of this country few ends can be more important, or conduce better to the welfare of the people, than the prevention or alleviation of widespread famine, and the creation of wealth which would enable a people to tide over such times of scarcity or famine as are, in the nature of things, inevitable; and therefore any measures which may be required for the creation or fostering of industries that may tend to bring about this wholesome state of things are at least as justifiable as those which have been adopted in the case of the railways. If, however, this is to be objected to as being an interference with the principles of political economy, any

action on the part of the State in regard to famines, or even the administration of relief by private charity, may equally be held to be objectionable on the same ground.

6. It seems to me therefore that it is not only incumbent on the Government to create and foster industries which are calculated to prevent or mitigate the effects of famines in India, but that no reasonable objection could be taken to such a course of action on its part under the existing circumstances.

7. I now beg to mention some of the industries or trades which it is possible and desirable to develop with the aid of Government.

The State is a large purchaser of stores which are required for the public service in the civil and military departments. At present every item of these stores, from the biggest machinery to the smallest doornail, is imported from England; but if, instead of doing so, Government holds out promises to intending manufacturers to purchase on the spot such of the stores as could be made in the country itself, some industries may be expected to arise and flourish in due course. I would specify the following instances:—

- (1.) Paper and stationery. So much and such variety of this item is required by Government that I believe its manufacture is one of the first that might be encouraged. Native paper is as much durable as any; and if it were at all in requisition by Government, it could probably be produced on a larger scale, and thus sold cheaper than is the case at present; while there are materials enough for the manufacture of paper on the European models. Good ink is now a days manufactured in India, and though the item is small, I do not see why it should not be exclusively used in all Government offices, and the importation of European ink abandoned.
- (2.) Large quantities of raw hides are exported from India. If the Government were known to be favourable to local manufacture, and expected to purchase shoes and other leather work, worked and turned out in the country for the army, private enterprise would probably be found to engage in utilising the raw materials on the spot.
- (3.) All cotton clothing required for the army and police might, with the same view, be purchased from local manufacturers.
- (4.) Some attempt has recently been made in Bombay to manufacture soap and candles, and the attempt might be fostered by means of purchase of such quantity as may be required by the State.
- (5.) The same may be said of earthen and glass ware, including tiles, &c.
- (6.) The same also of medical stores, some of which are now manufactured by local chemists.

8. Equally important in itself, and indeed very essential to the prosperity of the present and prospective industries, is the development of the mineral resources of the country, especially iron and coal. The existing steam factories, on this side of India at least, have to depend for their fuel on English coal, because, though coal is produced in India, its cost to the consumer in Bombay exceeds all charges on that which is brought from Europe over the distance of half the globe. This excessive cost is due to railway charges; and if coal mines have been opened, and the railways have been constructed with the object, partly at least, of developing the resources of the country, the charges ought to be reduced. Again, there are iron-ores in South India, and iron and copper, and perhaps coal too, in Guzerat. But before these resources of wealth can be utilised, some pioneering work is necessary, and India has not the capital or the enterprise necessary to undertake this work. In view of distant and prospective profits Government therefore might fairly be looked up to to devote some of its resources to this object, which in the end cannot fail to benefit the people, and, through their prosperity, the State.

9. These, and other like industries, if helped "into a lusty youth," may be expected fairly to stand on their own legs, and in due course (and I suppose this is the way in which great industries have arisen in all countries) their success would call into existence many subsidiary industries, which might be expected further to develop the resources of the country, and thus enable it to present a very different front to famine

from what it does at present. This is the chief object aimed at in the Memorandum under reference. But it seems to me that it will be accompanied by an equally important political advantage, inasmuch as it will furnish new paths for the employment of the intelligent middle classes, which is now so much desiderated, and would effectually arrest the feeling which is continually gaining ground among the people, that the country is becoming daily poorer, and, in consequence, their own condition worse and worse. Any measure which is calculated to remove this feeling and the cause of it, seems to me to be at least as important as the prevention or alleviation of famines.

10. Thus, viewed from all points of view, the policy

briefly indicated in the 5th paragraph of the Memorandum appears to me to be sound in itself, and calculated to prove beneficial in its consequences in more respects than one. But whatever its benefits, economical or political, I fear it is not likely to be carried out, because arrayed against it are potent interests and influences which, from their very position, are unable to comprehend its eminently beneficial character. It is, however, the duty of those who feel persuaded of its soundness, and are interested in the welfare of the millions of this country, to press it on the attention of the authorities with whom it rests, to some extent at least, to shape its fortunes; and it is in this view that I have made these remarks.

XV.—AHMEDNAGAR IRRIGATION.

NOTE ON AHMEDNAGAR IRRIGATION, BY MR. ANDREW WINGATE.

Mr. Boswell, in his Irrigation Report for 1874-75 for the Ahmednagar District, stated that Government had constructed three irrigation works in the district capable of watering 41,510 acres; that only 457 acres were irrigated; and that this was due to the poverty of the people. There is also a fourth canal, for which he could get no statistics

The Deccan Ryots Commission quote (p. 41) the

report of the Executive Engineer for Irrigation in June 1875, and of the Assistant Collector, to the effect that, the ryots being so deeply indebted that all the surplus produce of the land goes to the sahukar, they do not care to increase that produce by irrigation.

The Irrigation Report for 1876-77 gives the following statistics as to these canals:—

Area commanded - -				Lakh Canal.			Ojhar Canal.			Bhatodi Tank.		
				Acres. 25,000			Acres. 4,408			Acres. 14,000		
Area capable of irrigation.	Perennial	-	-	1,500	—			800				
	Rabi	-	-	5,400	—			1,200				
	Kharif	-	-	10,100	3,200			6,000				
	Total	-	-	17,000	3,200			8,000				
Area actually irrigated.	Year.			Kharif	Rabi.	Total acres.	Kharif.	Rabi.	Total acres.	Kharif.	Rabi.	Total acres.
	1868-69	-	-	—	—	123½	—	—	—	—	—	—
	1869-70	-	-	—	—	42	—	—	—	—	—	—
	1870-71	-	-	—	—	20½	—	—	—	—	—	—
	1871-72	-	-	—	—	736½	—	—	—	—	—	363
	1872-73	-	-	—	—	153	—	—	—	—	—	68½
	1873-74	-	-	66	50	116½	—	—	—	44	152½	196½
	1874-75	-	-	14	56	70	8	—	8	100	289	389
	1875-76	-	-	12	81	93	—	185½	185½	85	229	614
	1876-77	-	-	55	1,148	1,203	363	1,018	1,381	124	215	339
	1877-78	-	-	541	1,000	1,541	877	963	1,840	234	321	556
Capital Outlay.	Capital outlay - -			Rs 3,49,420			Rs. 2,16,707			Rs 3,63,327		
	Revenue receipts up to 1876-77			6,885			1,353			6,111		
	Working expenses - -			60,467			3,243			9,514		
	Deficit - - -			53,532			1,890			3,403		
	Add simple interest - -			1,15,301			24,205			82,578		
	Total deficit -			1,68,883			26,095			85,981		
Lakh Canal.				Ojhar Canal.				Bhatodi Tank.				
Water rates per acre.	Fixed, 1868, for five years.				Fixed, 1873, for five years.				Fixed in 1871.			
	Perennial - - - Rs. 8 per acre				8 months' irrigation - - Rs. 4 per acre.				Perennial - - - Rs. 8 per acre.			
	Rabi - - - - - " 4 "				4† " " - - - " 2 "				Rabi† - - - - - " 4 "			
	Monsoon * - - - - - " 2 "				Monsoon dry crops, - - - Re. 1 "				Moonsoon§ - - - - - " 2 "			
	[* For 1872, reduced to Re. 1.]				Between February and May - - - Rs. 4 "				[† First year only Rs. 2.]			
	Fixed, 1874, for five years.				† In 1876-77, rate for rabi jowari on Lakh and Ojhar Canals was reduced to Re. 1 per acre.				[§ From 1873, dry crops, Re. 1.]			
	Perennial - - - Rs. 8 per acre											
	Eight months - - - " 4 "											
	Four† " - - - - - " 2 "											
	Monsoon (dry crops) Re. 1 "											
Between February and May - - - Rs. 4 "												

Lakh Canal.—Commenced in 1866, and practically complete in 1873-74. The head works are on the Pravará river, fed from the western gháts.

The discharge for kharif and early rabi is unfailing. In 1876-77, the discharge was enough to irrigate 4,000 acres of rabi. But the hot weather supply is uncertain.

AVERAGE MONTHLY DISCHARGE OF CANAL.

	Number of cubic feet per second.		
	1874-75.	1875-76.	1876-77.
February . . .	16	33	48
March . . .	13	24	43
April . . .	12	27	49
May . . .	44	13	51
June . . .	175	157	97
July . . .	182	182	182
August . . .	182	182	182
September . . .	182	182	182
October . . .	145	174	65
November . . .	59	92	67
December . . .	43	47	33
January . . .	39	32	47

The canal has a capacity of 182 cubic feet per second at the head. Irrigation is almost entirely by flow. The crops irrigated are chiefly wheat, jowari, and gram. In the years of drought, 1871-72 and 1876-77, irrigation temporarily extended, and mostly in wheat and jowari, both rabi. The early rains of 1877-78 partially failed.

The average rate per irrigated acre was from 4 to 6 rupees in 1868-76, but Rs. 2.42 in 1876-77.

Eleven villages took water in 1876-77 and 22 villages were "commanded." In the two taluks in which they lie, the following are the statistics:—

	Rahuri.	Nowasa.
Area cultivated per male adult ...	60	112
Average assessment paid per acre ...	0 10 7	0 6 8

There are storage works proposed to augment the rabi supply.

Ojhar Canal.—Commenced as a relief work in 1869, and completed in 1876-77. This work is also on the Práwará river; and as the Lakh Canal already undertook to utilize the rabi supply of water, the Ojhar Canal was only expected to irrigate rice, followed by a light rabi crop in seasons of exceptionally good supply.

The discharge is 125 cubic feet per second, and irrigation is almost all by flow. The main crops irrigated are wheat, jowari, and bajra, but no rice.

The monsoon supply is generally certain, but sometimes falls short in September. In two out of four years it is ample to end of October. After January the stream is very small. Though kharif irrigation was mainly intended, in practice, the withdrawal of a portion of the dry-weather flow is found not to interfere with the Lakh Canal supply.

Nine villages of Sangamner town are "commanded." The average rate per acre during the three years 1874-77 was Rs. 2.30.

The storage works for the Lakh Canal will, if carried out, benefit this too.

Bhatodi Tank.—This work comprised the restoration of a ruined tank, on the Mekhri river, near the town of Ahmednagar. It consists of a masonry dam and 4½ miles of canal, with a discharge of 140 cubic feet per second at the head. The tank has an available capacity of 149 millions of cubic feet, and fills with a fall of 5.40 inches, of which a quarter inch runs off. The work was begun in 1868, and finished in 1876-77. But the area under present command is only 1,560 acres, and during the first five years the storage secured was less than half the complete scheme. Eight villages in Ahmednagar town are "commanded." The irrigation was all by flow till 1876-77, when 102 acres were irrigated by lift.

The principal crop irrigated is jowari, but sugar, wheat, and grain, are also grown. The average rate of assessment per acre has been from Rs. 2 to 4 from 1871 to 1876; for 1876-77 it was Rs. 2.71.

Remarks.—It will be noticed that, in describing only 457 acres as irrigated out of 41,510 irrigable, the case is over-stated. The works were in their infancy (two still incomplete) when Mr Boswell wrote. Even now, though 43,000 acres are "commanded," only 28,000 acres are irrigable, and in 1874-75 there could barely have been 20,000 irrigable.

Name of canal.	Area com- manded.	Area irri- gable.	Acres irrigated, 1874-75.
Lakh . . .	25,000	17,000	70
Ojhar . . .	4,408	3,200 ¹	8
Bhatodi . . .	14,000	8,000 ²	389
	43,408	28,200	467

Then, of these 28,000 acres finally estimated to be irrigable, over 19,000 acres are due to estimated kharif cultivation; and it is evident that, with ordinary crops and ordinary rainfall, the ryots of the district confine themselves mainly to rabi irrigation: now, it is only on the Lakh Canal that any large rabi irrigation was possible. It was not calculated for on the Ojhar Canal, and the Bhatodi tank stored only half its full supply during the first five years.

The advantage of these works, from a famine point of view, appears in the years of drought when the water is turned over a large area to save the dry crops. One year's flooding neither needs manure, nor extra nor stronger cattle, nor does it injure the land. And, in addition to this temporary benefit, there is the gradual extension of regular irrigation, and an increase of permanent prosperity.

10-12-78.

A. W.

¹ In 1874-5 only 3¾ miles, out of 10 miles, open.

² In the same period not more than 1,500 acres irrigable.

XVI.—VITAL STATISTICS OF INDIA.

NOTE ON THE VITAL STATISTICS OF 1876-79, BY MR. ELLIOTT.

The following note has been drawn up in order to present, in a concise and uniform manner, the recorded number of deaths and births in the different provinces of India during the four years 1876-79, and in order to shew what light is thrown by these statistics on the effect which famine and the diseases which accompany famine, produce on the numbers of the population.

MADRAS.

THE conclusions to be drawn from the Madras Vital Statistics have been summed up in a very complete manner by Dr. Cornish in his report dated 14th March 1879: and it will be sufficient, for the most part, to summarise the results of his observations here.

2. The total number of deaths registered in 1877 was 1,556,312, or more by 875,928 than in 1876, and the number registered in 1878 was 809,557, a figure which still exceeded that of 1876 by 129,173. These figures give a combined excess mortality for the two years over that of 1876 of 938,730. But there can be no doubt that the whole of the deaths that actually occur have never yet found a place in the mortuary registration. Dr. Cornish states—"It will be quite safe to say that the figures in the registration tables do not account for more than two-thirds of the actual mortality." Now, taking the past registration of eight years, 1869-76, the number of deaths recorded yearly has been 524,280;

and raising this figure by the above ratio, or 50 per cent., the actual average number of deaths has been 786,420 a year, or 1,572,840 in two years. The number recorded in 1877 and 1878 has been 2,365,869; and supposing the same proportion of deaths still to have been unregistered, the actual mortality was 3,548,803, or an excess of 1,975,963 above the average mortality of any ordinary two years.

3. The following table shows the number of registered deaths and the death-rate per mille for each district of the Presidency during 1876, 1877 and 1878. The districts are arranged in two classes; those in which famine prevailed in 1877 being placed first. It is evident that some of the non-famine districts of 1877 suffered severely in 1878 from the comparative failure of the rains of 1877, and the high prices that prevailed during the year.

STATEMENT SHEWING THE NUMBER OF DEATHS (BY DISTRICTS) IN THE MADRAS PRESIDENCY.

DISTRICTS.	Population (under registra- tion).	1876.		1877.		1878.		1879.	
		Number of Deaths.	Ratio per mille.	Number of Deaths.	Ratio per mille.	Number of Deaths.	Ratio per mille.	Number of Deaths.	Ratio per mille.
(FAMINE)									
Nellore - -	1,376,483	24,092	17·5	65,831	47·8	37,924	27·5	14,179	10·3
Madras Town - -	381,926	14,868	38·9	45,636	119·4	18,392	48·1	13,059	34·1
Chingleput - -	934,523	22,339	23·9	61,713	66·	16,973	18·1	17,194	18·3
South Arcot - -	1,755,324	36,199	20·6	96,754	55·1	40,618	23·1	32,326	18·4
Trichinopoly - -	1,199,155	27,905	23·3	66,674	55·6	29,037	24·2	20,710	17·2
Madura - -	1,327,899	23,983	18	79,310	59·7	31,977	24·1	23,068	17·3
Tinnevelly - -	1,693,629	38,725	22·8	68,425	40·4	37,971	22·4	31,049	18·3
Karnul - -	914,232	37,841	41·3	85,869	93·9	43,864	47·9	24,446	26·7
Cuddapah - -	1,350,967	39,394	29·1	120,301	89·	55,037	40·7	29,556	21·8
Bellary - -	1,665,815	55,823	33·5	154,367	92·6	76,138	45·7	40,910	24·5
North Arcot - -	1,929,927	50,086	25·9	159,704	82·7	50,562	26·2	34,047	17·6
Salom - -	1,936,362	45,761	23·2	177,362	90·1	49,455	25·1	31,968	16·2
Coimbatore - -	1,762,679	26,358	14·9	99,912	56·7	29,500	16·7	21,460	12·1
Nilgiris - -	74,531	1,274	17·	3,429	46·	1,932	25·9	1,122	15·0
Total - -	18,333,452	444,738	24·2	1,285,287	70·1	519,380	28·3	335,094	18·8
(NON-FAMINE.)									
Ganjam - -	978,740	24,615	25·1	19,890	20·3	28,988	29·6	15,325	15·6
Vizagapatam - -	1,544,529	22,256	14·4	27,477	17·7	28,055	18·1	23,990	15·5
Godavari - -	1,592,103	40,851	25·6	32,886	20·6	59,517	37·4	43,993	27·6
Kistna - -	1,452,066	29,216	20·1	36,625	25·2	41,707	28·7	30,608	21·0
Tanjore - -	1,972,820	50,699	25·7	73,846	37·4	56,021	28·4	42,784	21·6
South Canara - -	918,042	16,996	18·5	30,707	33·4	33,412	36·4	22,151	24·1
Malabar - -	2,236,220	51,013	22·8	49,594	22·1	42,477	18·9	34,213	15·2
Total - -	10,694,520	235,646	22·	271,025	25·3	290,177	27·1	213,064	20·8
GRAND TOTAL - -	29,027,972	680,384	23·4	1,556,312	50·3	809,557	27·8	548,158	19·2

4. The following table shows the registered deaths of the three years, month by month. It will be seen that the extraordinary mortality ended with March 1878, and

that, from then to the end of the year, the number of deaths was slightly, but not remarkably, in excess of the number recorded in 1876:—

STATEMENT SHEWING THE NUMBER OF DEATHS (BY MONTHS) IN THE MADRAS PRESIDENCY.

Months.	1876.	1877.	1878.	1879.
January -	61,962	116,195	110,313	68,125
February -	55,434	104,717	73,336	51,016
March -	47,537	103,652	68,178	44,962
April -	49,244	89,133	55,816	40,273
May -	51,696	104,086	53,969	36,997
June -	56,750	108,517	55,354	38,505
July -	65,513	150,719	65,962	46,284
August -	54,994	173,933	69,985	46,121
September -	47,665	167,994	67,855	44,944
October -	45,053	141,622	62,494	44,304
November -	56,511	148,393	53,544	44,012
December -	88,027	147,351	67,751	47,820
TOTAL -	680,384	1,556,312	809,557	553,363

5. The next statement arranges the deaths according to their attributed causes, and shows what an immense number were set down to cholera in 1877, and to fever in 1877 and 1878; the small-pox deaths being also very numerous in both years. On this subject Dr. Cornish remarks that "many of the deaths recorded as due to fever were primarily connected with enfeebled health arising from long privation." In his letter dated 20th June 1878, he entered more fully into this subject. He showed there that these diseases had been much more fatal in the famine than in the non-famine districts; and that though "there was no relation between the prevalence of cholera in the population and the intensity of famine distress, still there can be no question that the antecedent conditions of the famine did in a very great degree contribute to prepare the people to fall victims to this special form of pestilence." "The relation of the cholera mortality to the famine I believe to be this. The pestilence was present with us before the food-dearth began, but it was aggravated by the wandering habits of the famine sufferers, and by their aggregation in unusual numbers on works instituted for

"their relief, and in market towns and food centres, and also by the resort to strange and unnatural articles of diet, and by the use of contaminated water." And he winds up with these words:—"In famine, as in war, the casualty list cannot be confined to the few who succumb to the enemy. The abnormal conditions of famine bring the sufferers under pestilential influences and unwholesome social relations; and we cannot, in dealing with the consequences of famine, ignore those influences, or treat them as if they were something mysterious and apart from the inevitable results of massing the people in unusual crowds on relief-works and in camps."

STATEMENT SHEWING THE NUMBER OF DEATHS (BY DIFFERENT CAUSES) IN THE MADRAS PRESIDENCY.

Causes.	1876.	1877.	1878.	1879.
Cholera -	139,025	357,430	47,144	13,295
Small-pox -	21,650	88,321	56,339	17,676
Fevers -	221,653	469,241	374,623	294,628
Bowel-complaints -	34,576	133,366	47,982	23,206
All other causes -	263,480	507,954	283,469	209,353
TOTAL -	680,384	1,556,312	809,557	548,158

6. Birth registration has been carried on in Madras alongside with the registration of deaths, but has always been the more imperfect of the two. It had improved, however, from the year when it was first started, till in 1875 and 1876 it recorded a rate of 21·3, the real rate being, in Dr. Cornish's opinion, 38 per mille. The number of births recorded in 1875 and 1876, or 1,270,884, ought therefore to be raised in this ratio: and so ought the number recorded in 1877 and 1878, or 825,792. The decrease in births, which is recorded as 445,092, ought therefore to be raised in the same proportion to 794,059.

7. The following statement shews the number of births, and the ratio per mille, for each district:—

STATEMENT SHEWING THE NUMBER OF BIRTHS (BY DISTRICTS) IN THE MADRAS PRESIDENCY.

DISTRICTS.	Population.	1876.		1877.		1878.		1879.	
		Number of Births.	Ratio per mille.	Number of Births.	Ratio per mille.	Number of Births.	Ratio per mille.	Number of Births.	Ratio per mille.
(FAMINE)									
Nellore - -	1,376,483	16,507	11·9	7,692	5·6	4,830	3·5	10,722	7·7
Madras - -	381,926	11,283	29·5	13,929	36·4	15,008	39·3	16,092	42·1
Chingleput - -	934,523	21,663	23·1	12,468	13·3	14,082	15·0	27,592	29·5
South Arcot - -	1,755,324	38,142	21·7	31,396	17·8	17,955	10·2	31,356	17·8
Trichinopoly - -	1,199,155	35,559	29·6	28,967	24·1	17,510	14·6	25,841	21·5
Madura - -	1,327,899	30,044	22·6	20,627	15·5	9,924	7·4	18,029	13·5
Tinnevelly - -	1,693,629	37,434	22·1	27,403	16·1	23,629	13·9	33,410	19·7
Karnul - -	914,232	18,439	20·1	10,507	11·4	3,074	3·3	6,512	7·1
Cuddapah - -	1,350,967	24,162	17·8	14,626	10·8	5,781	4·2	14,719	10·8
Bellary - -	1,665,815	41,151	24·7	22,428	13·4	8,645	5·2	14,492	8·6
North Arcot - -	1,929,927	41,737	21·6	25,591	13·2	14,465	7·5	38,476	19·8
Salem - -	1,966,362	49,509	25·1	25,666	13·	14,038	7·2	25,387	13·
Coimbatore - -	1,762,679	31,841	18·	21,700	12·3	12,502	7·1	23,552	13·3
Nilgris - -	74,531	1,039	13·7	1,256	16·8	950	12·7	1,026	13·7
Total - -	18,333,452	398,510	21·7	264,256	14·4	162,443	8·8	287,206	15·0
(NON-FAMINE.)									
Ganjam - -	978,740	26,875	27·4	22,933	23·4	15,556	15·9	16,902	17·2
Vizagapatam - -	1,544,529	26,741	17·3	23,412	15·1	22,106	14·3	15,702	10·1
Godavari - -	1,592,103	32,271	20·2	30,828	19·3	30,029	18·8	25,076	15·1
Kistna - -	1,452,066	27,546	18·9	22,292	15·3	21,141	14·5	22,774	15·6
Tanjore - -	1,972,820	59,747	30·2	54,626	27·6	48,726	24·7	58,975	29·8
South Canara - -	918,042	20,142	21·9	18,659	20·3	16,083	17·5	15,858	17·2
Malabar - -	2,236,220	40,281	18	40,440	18·1	32,262	14·4	33,814	15·0
Total - -	10,694,520	233,603	21·8	213,190	19·9	185,903	17·3	189,101	17·7
GRAND TOTAL - -	29,027,972	632,113	21·7	477,446	16·4	348,346	12·	476,307	16·0

On this Dr. Cornish remarks: "The great fact of importance in regard to this table is the extraordinary low birth-rate throughout the year 1878 in the districts which most severely felt the famine. In Nellore the registered births were only 3·5 per mille of the 1871 population, in Karnul 3·3, Cuddapah 4·2, Bellary 5·2, and for the whole famine area the birth-rate was only 8·8 per mille, as compared with 20·0 per mille, the average registration of the five years ending 1876. In the districts included in the famine area, for every 1,000 births registered in former years there were only 443 in 1878. Those districts include a population of about 18½ millions, and it may be noticed here that this population give only 162,443 births in 1878, while the lesser population of 10½ millions of the non-famine area shews 185,903 births in the same period."

8. The next statement shows the birth-rate month by month:—

STATEMENT SHEWING THE NUMBER OF BIRTHS (BY MONTHS) IN THE MADRAS PRESIDENCY.

Month.	1876.	1877.	1878.	1879.
January - -	43,054	40,003	26,981	31,009
February - -	39,962	33,891	22,444	26,387
March - -	44,620	38,194	22,253	29,241
April - -	48,125	40,818	22,368	29,335
May - -	52,066	45,054	24,286	31,589
June - -	54,284	44,484	26,752	34,335
July - -	64,165	49,162	30,062	43,883
August - -	61,477	44,310	31,608	48,053
September - -	61,479	38,705	33,599	49,047
October - -	58,780	37,541	35,900	51,252
November - -	104,101	33,567	36,730	50,352
December - -		31,718	35,363	48,249
Total -	632,113	477,447	348,346	472,712

Dr. Cornish remarks, in reference to this, that the number of births is still much below the average. "The normal fecundity of the people has not been restored over wide areas of the Presidency. The recovery from famine influences is very slow, especially in those parts where famine raged the fiercest and was longest in dying out. Another year must elapse before the birth-rate will exhibit the proportions it occupied before the famine."

9. The diminution in births having been nearly 800,000 in the two years 1877-78, Dr. Cornish estimates that, before the old rate is reached again, the deficiency

will have amounted to a million. Adding this to the excess number of deaths, the total decrease in the population of the Presidency, due to the famine of 1877, is calculated by him at three millions.

10. Dr. Cornish further shews that these results agree closely with the indications given by the Test Census of March 1878 as interpreted by him in his letter of June 20th, 1878, and in his paper on "The Influence of Famine on the growth of Population." He shewed there that the Test Census pointed to a decrease of 1,843,062 in the seven districts wholly or partially counted, which had a population of 12,684,000 souls; and that, by applying similar ratios to other famine-stricken but not enumerated districts, according to what was known to have been the degree of their sufferings, a loss of 757,501 was arrived at out of a population of 4,575,000 souls, making altogether a loss of 2,400,567 out of a total population of 17,259,290. Since that date, in the last ten months of 1878, there has been an excess mortality of 283,312, and a deficiency of 452,700 births (calculating on the ratios assumed in paragraphs 6 and 6 respectively), thus making an additional loss of 736,000. Adding this to 2,400,567, we get a total defect of 3,136,567, which very nearly agrees with the loss brought out by the mortuary registration alone. Thus, these two sources of information bring out results which correspond as nearly as can reasonably be expected.

BOMBAY.

11. The first table shews the registered deaths for three years in each district of the Presidency, the districts being arranged in two classes—those which did, and did not suffer from famine in 1877. The Kaladgi district was the one in which the pressure of famine was severest, and its death-rate reached in 1877 the highest figure ever recorded in any district in India—101·8 per mille. The mortality registered in the nine famine districts in 1877 was more than double that registered in 1876, and for the whole Presidency there was an excess of 257,717 deaths over the preceding year. The returns for 1878 show how fatal to life the prolongation of distress and of high prices was in that year, and how the failure of crops in Guzerat almost brought that province into the famine category. The highest ratio for the year is that of the Panch Mahal district—75·6 per mille; but Brouch, Kaira, and Ahmednagar also shew a considerably enhanced death-rate. These are districts which were free from famine in 1877; in the nine famine districts of that year the mortality of 1878 was much lower, though still excessive in Dharwar and Belgaum.

STATEMENT SHEWING THE NUMBER OF DEATHS (BY DISTRICTS) IN THE BOMBAY PRESIDENCY, EXCLUDING SIND.

DISTRICTS.	Population.	1876.		1877.		1878.	
		Number of Deaths.	Ratio per mille.	Number of Deaths.	Ratio per mille.	Number of Deaths.	Ratio per mille.
(FAMINE.)							
Kaladgi - - -	816,037	20,628	25·3	83,053	101·8	24,209	29·7
Dharwar - - -	988,037	31,726	32·1	83,857	84·9	42,365	42·9
Belgaum - - -	938,750	31,021	33·	70,244	74·9	44,208	47·1
Satara - - -	1,061,002	24,775	23·3	52,033	49·8	40,872	38·5
Sholapur - - -	718,034	18,339	25·5	35,054	48·8	26,648	37·1
Ahmednagar - -	773,938	20,640	26·6	30,891	39·	27,955	36·1
Nasik - - -	687,353	17,147	24·9	24,466	35·9	26,920	39·2
Poona - - -	907,235	19,841	21·8	30,819	34·	29,607	32·6
Khandesh - - -	1,028,642	20,511	19·9	25,885	25·2	36,454	35·4
Total -	7,919,028	204,628	25·9	436,302	55·1	299,238	37·9
(NON-FAMINE.)							
Kanara - - -	398,406	12,708	31·9	21,561	54·1	17,242	43·3
Ratnagiri - - -	1,019,136	15,585	15·3	21,289	20·9	18,663	18·3
Colaba - - -	350,405	4,499	12·8	6,254	17·8	6,665	19·0
Bombay City - -	644,405	20,553	31·9	33,223	51·5	26,686	41·4
Tanna - - -	347,424	16,457	19·4	23,611	27·9	20,962	24·7
Surat - - -	607,087	15,870	26·1	15,325	25·2	15,810	26·0
Broach - - -	350,322	7,569	21·6	7,751	22·1	15,208	43·4
Kaira - - -	782,733	18,151	23·2	15,396	20·2	30,890	39·5
Panch Mahals - -	240,743	5,183	21·5	3,557	14·8	18,214	75·6
Ahmedabad - - -	829,637	22,358	26·9	17,009	20·5	34,305	41·3
Total -	6,070,298	138,933	22·8	164,976	27·1	204,645	33·7
GRAND TOTAL -	13,989,326	343,561	24·5	601,278	42·9	503,883	36·

12. The next statement shows the mortality by months. The number of registered deaths began to rise in December 1876, and reached its maximum (68,576) in August 1877; it then fell steadily till February 1878, after which it rose again and reached its maximum again in August 1878, though that maximum was only 55,243, not nearly so great as in 1877. It fell again after August, but in December 1878 it was still considerably higher than it had been in December 1876.

STATEMENT SHEWING THE NUMBER OF DEATHS (BY MONTHS) IN THE BOMBAY PRESIDENCY*, EXCLUDING SIND.

Months.	1876.	1877.	1878.
January - - -	25,662	34,147	39,002
February - - -	24,465	32,608	29,155
March - - -	28,306	42,962	31,786
April - - -	27,890	45,660	37,732
May - - -	29,578	48,330	43,873
June - - -	26,829	49,443	44,258
July - - -	31,661	59,740	47,762
August - - -	34,153	68,576	55,243
September - - -	29,709	65,754	49,908
October - - -	25,834	57,166	45,099
November - - -	27,904	53,007	42,924
December - - -	31,570	43,850	37,121
Total -	343,561	601,243	503,883

13. The third statement shews the deaths arranged according to the causes to which they were attributed. They increased, as will be observed, under every specific head in 1877, but mainly under the head of "Fever" to which class it seems that many deaths were transferred which had formerly been placed among "Other causes." In 1878 the cholera epidemic still continued severe, but the numbers under "Small-pox" were very low, and under "Bowel-complaints" were less than in 1877. Two-thirds of the deaths were attributed to fever.

STATEMENT SHEWING THE NUMBER OF DEATHS (BY DIFFERENT CAUSES) IN THE BOMBAY PRESIDENCY, EXCLUDING SIND.

Causes.	1876.	1877.	1878.
Cholera - - -	32,029	57,252	46,754
Small-pox - - -	11,500	26,918	3,682
Fevers - - -	20,740	315,136	332,731
Bowel-complaints - - -	33,321	59,869	40,724
All other causes - - -	245,971	142,103	79,992
Total -	343,561	601,278	503,883

14. It remains to discuss the question how many deaths really occurred, and how many are attributable to the effects of the famine—a discussion which is of especial importance, because the grounds on which it has been argued, and the conclusions come to by the Sanitary Commissioner and the Government of Madras, differ widely from those of the Sanitary Commissioner and Government of Bombay. It is admitted in Bombay that, in all probability, the true normal mortality is 35 per mille per annum. If, then, the same argument was followed here as in Madras, it would be said that whatever ratio the average registered death-rate bears to the true normal death-rate, 35, that ratio must, probably, exist between the registered death-rate of 1877-78 and the true death-rate. Now, the average yearly number of deaths registered in the six years from 1871 to 1876 (excluding Sind) was 303,202, or 21.7 per mille: the true average number of deaths was 35 per mille, or 490,000. The number of deaths registered in 1877 and 1878 was 1,105,161; and the true number raised in the same proportion should have been 1,782,510: the excess of this over the number in two ordinary years is 802,510, or say 800,000 deaths.

15. This method of calculation has not, however, been adopted in Bombay. The Sanitary Commissioner, Dr. Hewlett, holds that "though the registration of deaths

"throughout the Presidency is, comparatively speaking, very inaccurate, there are good grounds for supposing that it was far more correct in 1877 from the increased attention paid to it by District officers, and from the establishment of village inspectors, who were constantly inspecting the death registers in every village of their beat." In these remarks he hardly appears to have given sufficient weight to the considerations arising from the increased difficulty of correct registration at a time when so large a part of the population was on the move, and when so many deaths were occurring by the roadside and in out-of-the-way places.

16. Further, with regard to the relation between the excessive mortality and the famine, Dr. Hewlett strikes out all deaths from cholera and small-pox, and admits as due to famine the excess of deaths from the other causes over the average number of deaths attributed to those causes in the five previous years. He says:—"I think the deaths from cholera may safely be eliminated. . . Without going so far as to say that there were no such cases" (as deaths from famine diarrhoea wrongly attributed to cholera), "I am convinced from the evidence I was able to collect that the great majority of the deaths recorded under the head of cholera was rightly ascribed to this cause." "I also consider that the deaths from small-pox may safely be eliminated: the poison is a specific one, and has no connection with famine." Treating the figures in this way, he found that in the nine famine districts the excess deaths due to fever, bowel-complaints, and other causes above the mean of the five previous years was 216,498; and that the deaths "from famine in these Collectorates certainly did not exceed, but must have been somewhat, perhaps considerably, under this." His Excellency Sir R. Temple however, in his Minute of 20th August 1878, considered that the proper course was to compare the registered deaths of 1877, not with the registered deaths of previous years, but with the assumed normal number of actual deaths; and that a considerable deduction ought to be made even from this figure, on account of the abnormal prevalence of fever. In this way the excess mortality due to famine up to the end of 1877 was calculated by him as "something near to 100,000."

17. These are the two opposite extremes to which the calculation of the amount of mortality can be pushed; the one placing it at 800,000, the other at 100,000. But it will be seen at once that there does not exist so great a divergence between them as these figures would imply. The one includes two years, 1877 and 1878; the other refers only to 1877. The one embraces all parts of the Presidency except Sind, thereby including large tracts which were not touched by the Famine of 1877, but the population of which suffered from high prices and from the loss of crops in Guzerat; the other deals only with the famine districts proper. The latter attempts to distinguish the deaths directly due to starvation; the former makes an estimate of all deaths that occurred during the period of scarcity, whether directly or indirectly due to the effect of famine, or even (as Dr. Cornish admits to be the case with a considerable number) attributable to epidemics whose origin was altogether independent of the famine.

18. The next two statements shew the registered births in the Presidency (excluding Sind) by districts and by months. In the nine famine districts the birth-rate fell from 26 per mille in 1876, to 20.3 in 1877, and to 13.8 in 1878. In the remainder of the country the birth-rate did not fall off in 1877; but the prolongation of the distress into 1878 brought it down there also to 19 per mille. Looking to the monthly returns, the decrease in the fecundity of the population appears to have set in about August 1877, and the numbers went on falling till February 1878, after which they slowly rose again. But the births in December 1878 had not yet reached their usual number, so that the check to the increase of the population will still continue to be felt in 1879.

¹ Sanitary Report, 1877, pp. 160-61.

² Dr. Lumsdaine, Sanitary Commissioner, writes in a note of 3rd March 1879 regarding the deaths from small-pox; "The affected may have come into contact with the unprotected during the movements to and fro of the stricken masses; and in this way there may have been an indirect influence."

STATEMENT SHEWING THE NUMBER OF BIRTHS (BY DISTRICTS) IN THE BOMBAY PRESIDENCY, EXCLUDING SIND.

DISTRICT.	Population.	1876.		1877.		1878.	
		Number of Births.	Ratio per Mille.	Number of Births.	Ratio per Mille.	Number of Births.	Ratio per Mille.
(FAMINE.)	816,037	18,581	22·7	11,467	14·	2,795	3·4
Kaladgi - - -	988,037	28,568	28·9	21,203	21·4	9,966	10·
Dharwar - - -	938,750	27,563	29·3	22,425	23·8	11,773	12·5
Belgaum - - -	1,061,002	28,334	26·7	23,664	22·3	18,725	17·6
Satara - - -	713,034	16,545	23·	9,155	12·7	6,769	9·4
Sholapur - - -	773,938	24,427	31·5	16,808	21·7	12,113	15·6
Ahmednagar - - -	687,353	19,097	27·7	17,670	25·7	15,431	22·4
Nasik - - -	907,235	19,617	21·6	15,152	16·7	11,740	12·9
Poona - - -	1,028,642	23,257	22·6	23,364	22·7	20,374	19·8
Khandesh - - -							
Total - - -	7,919,028	205,989	26·	160,908	20·3	109,686	13·8
(NON-FAMINE.)							
Kanara - - -	398,406	11,728	29·4	11,731	29·4	9,425	23·6
Ratnagiri - - -	1,019,136	16,451	16·1	15,710	15·4	11,989	11·7
Colaba - - -	350,405	5,339	15·2	5,616	16·	7,858	22·4
Bombay City - - -	644,405	13,466	20·8	13,720	21·2	12,489	19·3
Tanna - - -	847,424	16,773	19·7	18,804	22·1	16,503	19·4
Surat - - -	607,087	13,583	22·3	15,052	24·7	14,965	24·6
Broach - - -	350,322	5,683	16·2	7,275	20·7	6,271	17·9
Kaira - - -	782,733	18,158	23·1	19,995	25·5	15,726	20·
Panch Mahals - - -	240,743	4,615	19·1	5,618	23·3	4,464	18·5
Ahmedabad - - -	829,637	16,623	20·	18,822	22·6	16,225	19·5
Total - - -	6,070,298	122,424 ¹	20·1	132,343	21·8	115,915	19·
GRAND TOTAL - - -	13,989,326	328,413	23·4	293,251	20·9	225,601	16·1

STATEMENT SHEWING THE NUMBER OF BIRTHS (BY MONTHS) IN THE BOMBAY PRESIDENCY, EXCLUDING SIND

Months.	1876.	1877.	1878.
January - - -	22,991	22,993	18,058
February - - -	22,744	21,050	15,724
March - - -	26,784	26,167	16,669
April - - -	26,396	26,275	16,789
May - - -	27,532	28,910	17,651
June - - -	29,014	27,599	16,316
July - - -	32,091	28,378	19,663
August - - -	30,040	24,521	20,655
September - - -	29,485	23,228	20,930
October - - -	28,186	22,594	21,523
November - - -	27,886	21,527	21,388
December - - -	25,289	19,979	20,235
Total (excluding Sind) - - -	328,413	293,251	225,601

19. Taking the registered figures, the number of births recorded in 1877 and 1878 is less by 137,974 than the average of two years like 1876. But here, as in the case of the deaths, there is no doubt that the registration is below the truth. The lowest estimate that can be accepted places the birth-rate in India at about 40 per mille,¹ and therefore the births of a normal year like 1876 should be raised from 23·4 to 40 per mille, or from 328,413 to 559,560. Applying the same proportion (of 23·4 to 40), the actual births of 1877 and 1878 may be estimated at 887,200, or less by 231,900, or, say, 230,000, than the births of two ordinary years. This loss to the population must therefore be set down as one of the effects of the famine. If, then, we make our calculation for Bombay on the same system as that for Madras, we find that the decrease of population due to increased deaths and diminished births during the years 1877 and 1878 was 1,030,000. And the check to the ordinary birth-rate had not yet ceased to operate.

20. The accompanying diagrams shew a considerable resemblance in the variations of death-rate and birth-rate in the two Presidencies. In both the mortality

began to increase after October 1876, and rose to its maximum in August 1877; from that month it began to fall, and continued falling till January 1878 in Bombay, till May in Madras: it then began its second rise, and reached its second but lower maximum in August 1878, after which it decreased. Similarly, in both Presidencies the birth-rate began to fall after July 1877, and reached its minimum in February 1878; from that date it rose again very slowly, but showed an inclination to fall slightly in December 1878.

MYSORE.

21. The mortuary registration in Mysore has always been most imperfect. During the four years from 1872 to 1875, it hardly ever exceeded 10 per mille, and the average number of recorded deaths stood at about 51,000 on a census population of 5,055,412. In 1876 it rose to 54,265, or 10·7 per mille. In 1877 it shewed an immense increase, the number recorded being 223,033, or more than four times the figure of 1876.

In 1878 the deaths have fallen again to 73,770, or nearly 50 per cent. above the years before the famine. The excess mortality recorded in 1877 and 1878 as compared with 1875 and 1876 is therefore 191,500.

Now the true mortality was probably about 35 per mille, or 177,000, in ordinary years. If it be assumed that the degree of error in the returns was constant, then the actual number of deaths in 1877 and 1878 was to the recorded number as 35 to 10, and amounted to 770,500 and 258,200 respectively; the excess mortality of the two years was therefore 675,000 approximately.

22. It is doubtful, however, if this assumption contains the whole truth. There is good reason for holding that the defects in the registration were greater in 1877-78 than in ordinary years. The country was reduced to such a state of disorganisation by the famine, the officials were so entirely occupied by relief measures, the recording officers themselves were to so great an extent sufferers from starvation and disease, the population was so much on the move, and the deaths of wanderers and emigrants so numerous, that the difficulties of registration were enormously increased, and the opinion formed and recorded at the time by competent officers was that the work was done in a more perfunctory way than usual. In the interval between the preliminary

¹ Dr. Townsend, Sanitary Commissioner for the Central Provinces, places it at 55 per mille. Dr. Cornish, as has been seen, reckons it at 38 per mille in Madras.

and final Test Census in January 1878, it was shewn that deaths were occurring at the rate of 127·8 per mille among the stationary population (not counting the wanderers and the starvelings in hospitals); yet the mortuary returns shew a death-rate of only about 44 per mille in that month, even if the ratio is struck on a population of four millions only, allowing one million to have perished. It is, therefore, almost certain that whatever the loss of life has been, it has exceeded, and not fallen short of, the figure of 675,000.

23. The following statement shews the registered deaths by districts. The record is so far in accordance with the truth that it shews the highest rates in 1877 for the four districts which suffered most acutely from famine—Bangalore, Kolar, Tumkur, and Chitaldrug. But the district which stands highest of all, Kolar, owes its pre-eminence probably to its *not* having been the worst of the four, but having been least disorganised. The largest number of deaths undoubtedly occurred in Bangalore and Tumkur.

STATEMENT SHEWING THE NUMBER OF DEATHS (BY DISTRICTS) IN THE PROVINCE OF MYSORE.

District.	Population.	1876.		1877.		1878.	
		Number of Deaths.	Ratio per Mille.	Number of Deaths.	Ratio per Mille.	Number of Deaths.	Ratio per Mille.
Bangalore - - -	828,354	8,958	10·8	47,468	57·3	10,624	12·8
Kolar - - -	618,954	7,445	12·	44,296	71·5	9,901	15·9
Tumkur - - -	632,239	5,367	8·4	35,322	55·8	8,264	13·
Mysore - - -	943,187	7,019	7·4	27,212	28·3	10,957	11·6
Hassan - - -	639,877	6,164	9·6	21,086	32·9	8,953	13·9
Shimoga - - -	498,976	8,515	17·	12,788	25·6	11,233	22·5
Kadur - - -	362,465	4,144	11·4	12,366	34·1	6,492	17·9
Chitaldrug - - -	531,360	6,653	12·5	22,494	42·3	7,346	13·8
Total - - -	5,055,412	54,265	10·7	223,033	44·1	73,770	14·5

24. The second statement shews the registered deaths by months; and the figures in their rise and fall bear a considerable resemblance to the corresponding months of Madras. The most fatal month was August 1877; after that the mortality decreased till April 1878; it then rose again slightly till it reached its second period of maximum in July 1878; and from that point it fell steadily till December, by which time it stood at about the level of the months before the famine.

STATEMENT SHEWING THE NUMBER OF DEATHS (BY MONTHS) IN THE PROVINCE OF MYSORE.

Months	1876.	1877.	1878.
January - - -	-	8,052	10,784
February - - -	-	16,488	6,878
March - - -	-	23,496	6,150
April - - -	-	16,127	5,551
May - - -	-	19,751	5,826
June - - -	-	18,243	6,069
July - - -	-	23,099	6,921
August - - -	-	25,965	6,063
September - - -	-	22,969	5,527
October - - -	-	20,301	4,739
November - - -	-	16,125	4,688
December - - -	-	12,417	4,574
Total - - -	-	223,033	73,770

25. The third statement shews the deaths according to the causes to which they were attributed. The most noticeable point is the great outbreak of cholera in 1877, an outbreak which appeared to be connected with the famine in certain ways, such as its frequent appearance among the crowded gangs on relief-works, and it being possibly due to the foulness of the tank water which the people were compelled to drink in the great drought. But at the same time there were many noticeable cases where it attacked the well-to-do also, and slew people who had not suffered from hunger. The same thing was remarked of the severe epidemic of fever which followed the heavy rains of October and November 1877.

26. Births are not registered in Mysore, but there can be no doubt that the same phenomena existed here as were observed in Madras, and that the ordinary laws of fecundity were to a great extent suspended. In the interval between the two censuses in January 1878, births took place at the rate of 7 per mille per annum of the enumerated population, and this ratio agrees closely with that recorded in the famine districts of

STATEMENT SHEWING THE NUMBER OF DEATHS (BY CAUSES) IN THE PROVINCE OF MYSORE.

Cause.	1876.	1877.	1878.
Cholera - - -	12,087	58,648	723
Small-pox - - -	1,059	5,922	971
Fevers - - -	23,934	55,934	46,462
Bowel-complaints - - -	4,752	33,781	9,287
All other causes - - -	12,433	68,748	16,327
Total - - -	54,265	223,033	73,770

Madras for 1878. The birth-rate recorded in that Presidency for the two years was less by one-third than the ordinary rate, and the decrease is not over yet. Assuming that in untroubled years there were 200,000 children born annually in Mysore, then a decrease of this rate by one-third implies a loss of 133,000 to the population in two years. If Dr. Cornish is right in estimating the total loss of births in Madras at one million, or 3 per cent., on the population, then the loss in Mysore before the birth-rate recover itself will at the same rate have been 150,000.

27. Reckoning on these data, we arrive at the conclusion that the excess mortality of the two years cannot have been less than 675,000, and the decrease in births 150,000, or, say, a loss of population altogether amounting to 825,000. But it must be admitted that, with mortuary statistics so defective as these, it is impossible but that the conclusions drawn from them should be somewhat doubtful. The Test Census taken in January 1878, indicated a much heavier loss, and it is understood that inquiries made since then by the Chief Commissioner have rather deepened than removed the impression then conveyed as to the extent of the disaster that had befallen the Province.

CENTRAL PROVINCES.

28. The year 1877 was a peculiarly healthy one in the Central Provinces, the registered death-rate being only 23·9 per mille, while that of 1876 was as high as 30·3. In 1878, however, the deaths have been very numerous, the ratio rising to 45·61 per mille, and the number exceeding that recorded in 1876 by 160,768 and exceeding the average of the four preceding years by about

1 Death-rate in	1874	...	23·5
	1875	...	26·3
	1876	...	30·3
	1877	...	23·9
Average death-rate	...	...	26·

145,000. On the assumption which has been adopted in other cases, that the true ordinary rate of mortality in India is 35 per mille, the true increase of 1878 would be to 145,000 in the ratio of 35 to 26, that is, it would amount to 195,000.

29. The first statement shows the mortality by districts. The highest ratios are found in the Nimar

and Burhanpur districts, where fever prevailed in the latter part of 1878. The districts nearest to the North-Western Provinces and which might be presumed to have shared more than others in the failure of the rains of 1877 which was experienced in Upper India, do not, with the exception of Saugor,¹ show a higher death-rate than the average of the Province.

STATEMENT SHOWING THE NUMBER OF DEATHS (BY DISTRICTS) IN THE CENTRAL PROVINCES.

DISTRICTS.	Population.	1876.		1877.		1878.		1879.	
		Number of Deaths.	Ratio per mille.	Number of Deaths.	Ratio per mille.	Number of Deaths.	Ratio per mille.	Number of Deaths.	Ratio per mille.
Saugor - - - - -	527,725	18,649	35.3	17,237	32.6	29,525	55.95	18,185	34.4
Damoh - - - - -	269,642	10,091	37.4	7,593	28.1	12,196	45.23	10,237	38.0
Murwara - - - - -	145,933	5,090	34.8	3,586	24.5	4,815	32.99	5,201	36.3
Jubbulpore - - - - -	382,926	17,290	45.1	12,304	32.1	15,855	41.40	14,939	39.0
Narsinghpur - - - - -	339,395	15,403	45.3	10,368	30.5	13,554	39.93	8,724	25.7
Hoshangabad - - - - -	449,977	15,161	33.7	8,685	19.3	16,112	35.81	9,737	21.6
Nimar - - - - -	137,448	4,892	35.5	3,688	26.8	10,073	73.28	4,188	30.5
Burhanpur - - - - -	73,776	2,503	33.9	2,303	31.2	5,361	72.7	1,625	22.5
Betul - - - - -	278,857	8,843	31.7	7,294	26.1	11,767	42.19	8,275	29.7
Ohhindwara - - - - -	265,191	7,328	27.6	6,540	24.6	10,994	41.46	6,677	25.2
Seoni - - - - -	292,178	8,785	30.	7,165	24.5	9,966	33.90	10,061	34.4
Mandla - - - - -	213,018	6,376	29.9	8,102	38.0	8,993	42.22	9,739	45.7
Balaghat - - - - -	280,101	7,762	27.7	6,204	22.1	10,605	37.86	12,072	43.1
Bhandara - - - - -	564,813	15,480	27.4	12,223	21.6	26,144	46.30	20,771	36.8
Nagpur - - - - -	631,229	15,343	24.3	11,719	18.5	32,486	51.45	15,971	25.3
Wardha - - - - -	354,720	8,661	24.4	7,007	19.7	25,156	70.91	8,010	22.5
Chandha - - - - -	456,790	15,565	34	8,865	19.4	22,796	47.37	13,717	28.5
Upper Godavari - - - - -	24,425	735	30.	761	31.1				
Raipur - - - - -	883,246	19,340	21.9	18,463	20.9	40,610	46.88	40,257	45.6
Bilaspur - - - - -	516,722	13,596	26.3	10,913	21.1	21,760	42.11	27,045	52.3
Sambalpur - - - - -	319,962	8,131	25.4	6,115	19.1	9,199	28.75	8,480	26.5
TOTAL - - - - -	7,408,074	225,024	30.3	177,139	23.9	337,907	45.61	254,001	34.3

30. The next or monthly statement shows that the increase set in in January 1878, and reached its maximum in June. From that month it declined, but it remained very high throughout July, August, and September, and even in December it was still considerably above the average.

STATEMENT SHOWING THE NUMBER OF DEATHS (BY MONTHS) IN THE CENTRAL PROVINCES.

Month.	1876.	1877.	1878.	1879.
January - - - - -	12,683	13,297	16,153	17,625
February - - - - -	11,385	10,767	15,262	15,938
March - - - - -	13,550	12,469	21,117	19,700
April - - - - -	15,027	14,033	20,881	24,624
May - - - - -	18,621	14,042	26,490	33,185
June - - - - -	18,675	13,885	41,529	23,689
July - - - - -	23,405	13,002	36,947	19,116
August - - - - -	26,718	13,992	38,634	20,419
September - - - - -	24,658	16,817	36,024	19,809
October - - - - -	21,973	18,473	31,750	20,266
November - - - - -	20,886	18,878	26,414	21,213
December - - - - -	17,443	17,484	26,106	18,417
TOTAL - - - - -	225,024	177,139	337,907	254,001

31. The third statement shows the causes to which the deaths were attributed. Under every head there is an increase, but there was a specially severe outbreak of cholera and small-pox, and these two diseases together

STATEMENT SHOWING THE NUMBER OF DEATHS (BY DIFFERENT CAUSES) IN THE CENTRAL PROVINCES.

Cause.	1876.	1877.	1878.	1879.
Cholera - - - - -	20,124	3,418	40,758	27,548
Small-pox - - - - -	3,819	2,768	16,132	25,471
Fevers - - - - -	149,786	131,123	216,117	135,095
Bowel complaints - - - - -	19,952	14,867	26,044	19,622
All other causes - - - - -	31,343	24,963	38,856	46,265
TOTAL - - - - -	225,024	177,139	337,907	254,001

carried off more people by 32,947 than in 1876, and more by 50,604 than in 1877. The balance (an excess of 79,936 over 1876 and of 110,064 over 1877) is attributed to fever, bowel complaints, and other causes.

32. The Chief Commissioner of the Central Provinces, in his letter dated 30th November 1878, discussed the cause of this rise in mortality, and came to the conclusion that, putting aside "the two common and well-known epidemics of cholera and small-pox," he could only "ascribe the general increased fatality of "diseases to the high prices that have everywhere "prevailed during the period in question;" and he went on to show that "there has been everywhere a "most marked increase in the prices of food-grain, "the increase in some places being considerably more "than 100 per cent." This assertion, that where a high death-rate is found to be accompanied by high prices the two facts are in all probability closely connected together, agrees entirely with the view taken by the Sanitary Commissioner with the Government of India, and lies at the foundation of all sound use of vital statistics. But it may be doubted whether the two attributed causes of cholera and small-pox can be altogether set apart, and whether the mortality caused by them (even supposing it to be correctly diagnosed) is not to some extent affected by the unwholesome and scanty diet of a large part of the population.

33 The next two statements show only a slight falling off in the births of the year. This was to be expected, for a scarcity felt in 1878 will chiefly affect the fecundity of the population in 1879. As has already been observed, 1877 was a very healthy year, and the birth-rate of the first six months of 1878 was unusually high, standing at 40 per mille, and exceeding the births of the corresponding six months of 1877 by 18,826, and those of 1876 by 12,549. In the latter six months of the year (which usually show the greatest number of births) the figure for 1878 is less by 13,484 than the earlier six months of the year, and less by 26,272 and 20,471 than the corresponding six months of 1877 and 1876 respectively.

¹ Saugor - - - - -	55.95
Damoh - - - - -	45.23
Jubbulpore - - - - -	41.40
Narsinghpur - - - - -	39.93
Hoshangabad - - - - -	35.81

STATEMENT SHEWING THE NUMBER OF BIRTHS (BY DISTRICTS) IN THE CENTRAL PROVINCES.

DISTRICTS.	Population.	1876.		1877.		1878.		1879.	
		Number of Births.	Ratio per Mille.	Number of Births.	Ratio per Mille.	Number of Births.	Ratio per Mille.	Number of Births.	Ratio per Mille.
Saugor - - - -	527,725	20,457	38.76	19,946	37.80	19,852	37.6	19,354	36.7
Damoh - - - -	269,642	11,969	44.38	10,476	38.85	11,693	43.3	11,055	41.0
Murwara - - - -	145,933	7,220	49.47	6,447	44.18	7,027	48.1	5,969	41.0
Jubbulpore - - - -	382,926	15,823	41.32	14,818	38.69	17,298	45.1	13,554	35.4
Narsinghpur - - - -	339,395	14,568	42.92	13,505	39.79	14,400	42.4	11,687	34.4
Hoshangabad - - - -	449,977	13,863	30.80	14,648	32.55	16,227	36	13,631	30.4
Nimar - - - -	137,448	5,903	42.94	6,131	44.61	5,957	43.3	6,517	47.4
Burhanpur - - - -	73,776	2,534	34.34	2,536	34.37	2,222	30.1	2,343	38.5
Betul - - - -	278,857	11,796	42.30	11,602	41.60	10,431	37.4	10,643	38.2
Chhindwara - - - -	265,191	12,106	45.65	10,863	40.96	10,242	38.6	9,018	34.0
Seoni - - - -	292,178	13,339	45.65	12,027	41.16	11,809	40.4	8,930	30.6
Mandla - - - -	213,018	9,246	43.40	8,993	42.22	9,069	42.5	7,975	37.4
Balaghat - - - -	280,101	12,294	43.89	11,313	40.39	11,033	39.3	9,940	35.5
Bhandara - - - -	564,813	24,370	43.15	25,032	44.32	22,382	39.6	24,321	43.9
Nagpur - - - -	631,229	20,962	33.21	19,584	31.03	23,606	37.3	24,275	38.4
Wardha - - - -	354,720	10,929	30.81	12,916	36.41	11,313	31	13,305	37.3
Chanda - - - -	456,790	17,567	38.46	18,385	40.25	17,111	35.5	18,492	38.4
Upper Godavari - - - -	24,425	822	33.65	839	34.35				
Raipur - - - -	883,246	32,619	36.93	34,385	38.93	27,236	30.8	31,776	36.0
Bilaspur - - - -	516,722	21,534	41.67	23,311	45.11	21,782	42.1	25,495	49.3
Sambalpur - - - -	319,962	11,836	36.99	13,102	40.95	12,702	39.7	12,357	38.6
TOTAL -	7,408,074	291,757	39.39	290,859	39.26	283,392	38.25	281,687	38.0

STATEMENT SHEWING THE NUMBER OF BIRTHS (BY MONTHS) IN THE CENTRAL PROVINCES.

Months.	1876.	1877.	1878.	1879
January - - -	23,723	21,555	24,871	19,208
February - - -	20,418	16,932	22,578	16,632
March - - -	23,208	20,540	25,329	17,917
April - - -	24,580	23,612	25,556	19,443
May - - -	22,825	24,048	25,042	20,341
June - - -	21,225	22,895	25,062	19,955
July - - -	24,606	26,183	21,798	20,985
August - - -	25,772	26,799	24,748	26,953
September - - -	26,179	27,968	22,489	30,279
October - - -	27,382	26,359	22,189	32,049
November - - -	25,470	26,350	21,206	30,469
December - - -	26,016	27,567	22,524	27,556
TOTAL -	291,404	290,838	283,392	281,687

34. The general conclusion appears to be that the excess mortality in the Central Provinces in 1878 was about 200,000, and that of this number about 150,000 deaths were due to diseases clearly influenced by the effects of scarcity and high prices, while the rest are ascribed to epidemics which are obscurely connected with those causes. The whole effect of this scarcity has not yet passed away, but will continue to be visible in the returns of 1879, both in the higher death-rate and also in the decrease of the birth-rate, which had already in 1878 begun to experience a check.

PUNJAB.

35. In the Punjab the year 1876 was the unhealthiest ever known up to that time, but in 1877 the mortality was very much smaller than it had been in 1876. In 1878, however, it rose to a much higher figure than had been reached even in 1876, viz., 628,763 deaths—an excess of 224,805 over the average number of deaths recorded from 1869 to 1877. The average death-rate of those nine years was returned as 23.1, and that of 1878 was 35.9 per mille. On the assumption that the actual death-rate is 35 per mille in ordinary years, and that the same defects of registration existed in 1878 as in the previous nine years, the excess mortality of 1878 will be raised in the ratio of 35 to 23.1, and will stand at 340,660, or, say, 340,000.

36. The districts in which the highest ratio of mortality was reached are Gurgaon (67.9) and Delhi (55.4), which suffered severely from the drought of 1877 and the consequent scarcity, and Jullundur (65.5), in which not only was famine felt to some extent, but also an acute epidemic of fever followed the local floods of 1878. The following is a list of the other districts, which surpass the average of the Province:—

District.	Death-rate per mille.
Lahore - - - -	53.3
Amritsar - - - -	44.9
Ludhiana - - - -	44.8
Karnal - - - -	44
Perozepore - - - -	42.7

None of these five, except Karnal, are districts in which the Punjab Government consider that famine actually prevailed; but in all of them deaths from starvation were reported.

STATEMENT SHEWING THE NUMBER OF DEATHS (BY DISTRICTS) IN THE PUNJAB.

DISTRICTS.	Population	1876.		1877.		1878.		1879.	
		Number of Deaths.	Ratio per mille.	Number of Deaths.	Ratio per mille.	Number of Deaths.	Ratio per mille.	Number of Deaths.	Ratio per mille.
Gurgaon - - -	696,646	13,686	19.6	13,198	18.9	47,306	67.9	56,237	80.7
Delhi - - -	608,850	14,523	23.8	16,062	26.3	33,740	55.4	43,484	71.4
Rohtak - - -	536,959	9,097	16.9	9,902	18.4	20,178	37.5	35,782	66.7
Hissar - - -	484,681	5,911	12.1	5,869	12.1	12,082	24.9	20,461	42.2
Sirsa - - -	210,795	3,830	18.1	3,397	16.1	5,669	26.8	8,497	40.3
Karnal - - -	610,927	12,893	21.1	12,841	21.	26,929	44.	36,222	59.3
Umballa - - -	1,008,860	26,965	26.7	16,652	16.5	29,646	29.3	42,432	42.1
Simla - - -	33,594	597	17.7	501	14.9	705	20.9	1,013	30.1
Ludhiana - - -	583,245	16,199	27.7	13,006	22.3	26,182	44.8	19,768	33.9
Ferozepore - - -	533,416	12,771	23.9	8,479	15.8	22,824	42.7	13,945	26.1
Jullundur - - -	783,020	45,746	58.4	18,912	24.1	51,340	65.5	26,877	34.3
Hoshiarpur - - -	938,890	46,683	49.7	20,694	22.	36,029	38.3	32,612	34.8
Kangra - - -	743,758	18,772	25.2	14,856	19.9	16,655	22.3	24,135	32.4
Gurdaspur - - -	906,126	32,139	35.4	19,498	21.5	26,231	28.9	32,121	35.5
Amritsar - - -	832,750	34,105	40.9	31,717	36.	37,392	44.9	35,665	42.8
Lahore - - -	775,551	27,053	34.8	20,690	26.6	40,633	52.3	31,872	41.1
Montgomery - - -	359,437	8,301	23.	7,653	21.2	10,984	30.5	7,574	21.1
Mooltan - - -	459,765	13,703	29.8	11,679	25.4	12,783	27.8	9,179	18.5
Muzaffargarh - - -	295,547	7,094	24.	7,166	24.2	9,226	31.2	7,210	24.4
Jhang - - -	348,027	5,562	15.9	4,443	12.7	4,300	12.3	4,467	12.8
Gujranwala - - -	550,576	23,896	43.4	13,246	24.	18,668	33.9	18,812	34.2
Sialkot - - -	994,458	40,051	40.2	17,108	17.2	23,121	23.2	23,373	23.5
Gujrat - - -	616,347	13,685	22.2	10,846	17.5	17,708	28.7	19,008	30.8
Shaphur - - -	368,796	8,558	23.2	8,325	22.5	11,281	30.5	10,834	29.4
Jhelum - - -	500,988	9,487	18.9	10,047	20.	14,821	29.5	21,704	43.3
Rawalpindi - - -	699,647	13,055	18.6	14,836	21.2	26,035	37.2	46,875	67.0
Hazara - - -	367,218	6,177	16.8	4,957	13.4	9,353	25.4	8,749	23.8
Peshawar - - -	500,443	6,835	13.6	5,770	11.3	12,815	25.6	11,827	23.6
Kohat - - -	145,419	1,432	9.8	1,191	8.1	1,571	10.8	2,032	20.2
Brnnu - - -	287,547	5,384	18.7	5,255	18.2	6,201	21.5	6,501	22.6
Dera Ismail Khan - - -	394,864	7,406	18.7	7,786	19.7	10,730	27.1	8,763	22.2
Dera Ghazi Khan - - -	309,978	5,258	16.9	4,350	14.	5,625	18.1	4,233	13.7
TOTAL - - -	17,487,125	496,844	28.4	350,932	20.	628,763	35.9	673,164	38.5

37. The monthly statement shows that the increase of mortality did not begin to be very perceptible till May 1878, though the early months stood at a higher figure than is usual in that, the healthiest portion of the year. The deaths rose to an extraordinary height in October and November, after which they fell, but were still, in January 1879, 59,465, or nearly double the number in the corresponding months of 1876 and 1877. The ratio for the province was 73 and 74 per mille in October and November, and in some districts it reached an almost unparalleled height, as the following figures shew :—

District.	Ratio per mille.	
	October.	November
Jullundur - - -	254	196
Ferozepore - - -	145	86
Gurgaon - - -	141	126
Delhi - - -	116	134
Ludhiana - - -	111	126

STATEMENT SHEWING THE NUMBER OF DEATHS (BY MONTHS) IN THE PUNJAB.

Months.	1876.	1877.	1878.	1879.
January - - -	30,327	32,447	34,107	59,465
February - - -	22,150	25,809	29,710	48,167
March - - -	21,895	26,492	32,202	43,501
April - - -	20,730	23,527	34,292	39,375
May - - -	23,871	30,237	47,596	62,032
June - - -	24,561	33,991	44,015	47,883
July - - -	23,730	28,153	33,337	34,579
August - - -	31,060	25,382	34,476	45,955
September - - -	71,972	24,752	57,266	67,633
October - - -	105,400	29,509	105,802	91,727
November - - -	71,083	33,909	107,272	76,369
December - - -	50,065	36,724	68,688	56,478
TOTAL - - -	496,844	350,932	628,763	673,164

38. The third table shews the causes to which the deaths are attributed. Cholera was almost entirely absent, but there was a most severe outbreak of small-pox, and even in comparison with 1876 there is a great increase under the head of fevers as well as every other cause.

STATEMENT SHEWING THE NUMBER OF DEATHS (BY DIFFERENT CAUSES) IN THE PUNJAB.

Cause.	1876.	1877.	1878.	1879.
Cholera - - -	5,736	29	218	25,897
Small-pox - - -	10,254	12,296	40,221	49,489
Fevers - - -	351,286	219,281	440,487	472,911
Bowel-complaints - - -	27,271	17,665	32,070	29,813
All other causes - - -	102,297	101,661	115,767	95,024
TOTAL - - -	496,844	350,932	628,763	673,164

39. The subject of the excessive mortality of 1878 was discussed in a letter (No. 199, dated 13th January 1879) from the Government of the Punjab. The Sanitary Commissioner, dealing only with the figures up to September 1878, at which time the greatest mortality had not begun, remarks on the conjunction of a wide-spread scarcity with an abnormally high rate of mortality, rejects the hypothesis that the increase is due to a more effective registration, and says:—"I feel quite justified in asserting that not less than three-fourths, if not all, of the excess mortality is due to the high prices of food, that is, to want, or to diseases caused or accelerated by insufficiency of food." His Honour the Lieutenant-Governor, in forwarding this report, draws attention to the high rate of mortality from small-pox, but agrees that "any large increase in the mortality, as shown by the figures for the year 1878 must be due to exceptional causes, and is probably to be accounted for by scarcity and dearness of food."

40. There is no birth registration in the Punjab except in municipal towns, and therefore this branch of the inquiry cannot be pursued; but from what has been seen in other Presidencies and Provinces, there can be little doubt that here too the normal increase

of the population has been materially arrested, and that the next census will show that the loss due to the drought of 1877 has not been confined to the excess mortality, which alone may be apparently estimated at about 350,000.

NORTH-WESTERN PROVINCES AND OUDH.

41. The average number of deaths registered in the North-Western Provinces and Oudh for the seven years 1871-77 was 849,212. In 1876 the number recorded was somewhat in excess of this, or 937,490. In 1877 it was almost identical with the average, being 840,538. In 1878 it suddenly rose to the unprecedented figure of 1,521,666, being 672,454 in excess of the average. The death-rate per mille of the population represented by that seven-years average is 20·2. If the assumption be justified here as elsewhere that the actual death-rate in ordinary years is about 35 per mille, and that there was the same amount of shortcoming in the registration of 1878 as of previous years, then the real excess mortality of 1878 was to the recorded excess as 35 to 20·2, and amounted to 1,165,000 approximately. If, however, we look not at the calendar year 1878 only, but at the fourteen months, from November 1877 to December 1878, it appears that the number of deaths recorded was 1,721,652, against an average mortality for fourteen months of 990,747, giving a recorded excess of 730,905, and this raised in the same ratio of 35 to 20·2 brings out the result that in those fourteen months the actual excess mortality amounted to 1,265,000 deaths above the ordinary rate.

42. The statement below shows what the number of deaths has been in each district of the Province. The order of mortality in which those districts stand which

exceed the average death-rate of the Province is as follows:—

Districts.	Ratio per mille in 1878.
Muttra - - - - -	71·5
Agra - - - - -	57·1
Bijnor - - - - -	57·1
Shajahanpur - - - - -	55·3
Lucknow - - - - -	51·6
Rai Bareilly - - - - -	46·4
Bareilly - - - - -	45·5
Budaon - - - - -	45·
Lalitpur - - - - -	43·9
Basti - - - - -	42·3
Gorakhpur - - - - -	41·7
Unao - - - - -	40·5
Moradabad - - - - -	40·

All these districts suffered from famine in 1878, but not in the precise relative order in which they stand in this list. Muttra and Agra have risen to the top by reason of the violent fever epidemic which prevailed in the autumn: their mortality during the famine season proper was large, but did not place them so high as this. His Honour the Lieutenant-Governor in enumerating the famine districts, places them, though with some hesitation, and admitting that it is by no means easy to fix their precedence, in the following order:—Bijnor, and after it the other Rohilcund districts (Shajahanpur, Bareilly, Budaon, and Moradabad), Lucknow, Rai Bareilly, Bara Banki, Basti, Gorakhpur, Azamgarh, Agra, Muttra, Unao, Etah, Farakhabad, Hardoi, Sitapur, and Pertabgarh. Of these districts all those placed highest on the list, except Bara Banki and Azamgarh, appear in the number of the districts with the greatest mortality.

STATEMENT SHewing THE NUMBER OF DEATHS (BY DISTRICT) IN THE NORTH-WESTERN PROVINCES AND OUDH.

DISTRICTS.	Population.	1876.		1877.		1878.		1879.	
		Number of Deaths.	Ratio per mille.	Number of Deaths.	Ratio per mille.	Number of Deaths.	Ratio per mille.	Number of Deaths.	Ratio per mille.
(N. W. PROVINCES.)	(According to Census of 1872.)								
Dehra Dun -	115,711	2,320	20·	2,040	17·6	2,295	19·8	3,562	30·7
Saharanpur -	883,782	22,508	25·4	17,689	20·	30,135	34·	47,181	53·3
Muzaffarnagar -	690,082	19,087	27·6	18,065	26·1	23,857	34·5	42,470	61·5
Meerut -	1,273,914	19,774	15·5	19,957	15·6	38,229	30·	109,751	86·1
Bulandshahr -	936,593	20,350	21·7	17,265	18·4	28,609	30·5	109,360	116·7
Aligarh -	1,073,108	26,090	24·3	19,842	18·4	38,095	35·5	127,166	118·5
Bijnor -	737,152	25,375	34·4	16,971	23·	42,153	57·1	27,095	36·7
Budaon -	934,348	27,330	29·2	27,706	29·6	42,078	45·	63,436	67·8
Moradabad -	1,122,131	32,463	28·9	27,910	24·8	44,930	40·	48,727	43·4
Bareilly -	1,506,801	42,001	27·8	32,094	21·3	68,623	45·5	45,816	30·4
Shahjahanpur -	949,471	29,621	31·1	27,793	29·2	52,599	55·3	48,656	51·2
Muttra -	729,580	16,387	22·4	14,169	19·4	52,208	71·5	52,697	72·2
Agra -	1,251,959	23,843	19·	24,021	19·1	71,550	57·1	68,440	54·6
Etah -	703,485	15,087	21·4	13,168	18·7	25,888	36·8	59,966	85·2
Farakhabad -	918,748	23,200	25·2	21,268	23·1	33,001	35·9	54,090	58·8
Mainpuri -	765,783	14,858	19·4	13,996	18·2	26,979	35·2	50,028	65·3
Etawah -	668,581	14,789	22·1	11,878	17·7	21,551	32·2	33,601	50·2
Cawnpore -	1,155,439	29,900	25·8	26,009	22·5	43,851	37·9	58,940	51·0
Fatehpur -	663,815	14,501	21·8	10,498	15·8	17,841	26·8	34,119	51·3
Allahabad -	1,394,245	25,514	18·2	19,768	14·1	40,449	29·	43,516	31·2
Banda -	697,611	85,532	22·2	16,157	23·1	23,425	33·5	29,493	42·2
Hamirpur -	529,137	17,428	32·9	13,329	25·	17,579	33·2	27,604	52·1
Jhansi -	317,735	10,802	33·9	7,227	22·7	10,636	33·4	14,202	44·6
Jalaun -	404,384	10,871	26·8	7,344	18·1	14,019	34·6	15,585	38·5
Lalitpur -	212,628	6,739	31·6	5,527	25·9	9,337	43·9	7,585	35·6
Jaunpur -	1,025,869	15,684	15·2	13,130	12·8	20,085	19·5	26,471	25·8
Azamgarh -	1,581,410	26,724	17·4	25,100	16·3	49,151	32·	40,469	26·4
Benares -	793,699	18,343	23·1	12,506	15·7	20,635	25·9	21,541	27·1
Mirzapur -	1,015,293	29,456	29·	19,721	19·4	27,793	27·3	32,144	31·6
Basti -	1,472,994	27,264	18·5	37,003	25·1	62,415	42·3	36,669	24·8
Gorakhpur -	2,019,350	42,131	20·8	52,090	25·7	84,393	41·7	71,873	35·5
Ghazipur -	1,345,401	30,324	22·5	26,114	19·4	46,634	34·6	46,410	34·4
Kumaon -	432,888	9,231	21·32	7,545	17·4	8,123	18·7	15,343	35·4
Garhwal -	310,282	6,572	21·18	5,762	18·5	7,091	22·8	8,500	27·3
Terai -	185,647	7,657	41·24	4,972	26·7	10,798	58·1	7,256	39·0
Total -	30,769,056	719,756	23·3	635,634	20·6	1,157,035	37·6	1,529,762	49·7

STATEMENT SHOWING THE NUMBER OF DEATHS (BY DISTRICT) IN THE NORTH-WESTERN PROVINCES AND OUDH—continued.

DISTRICTS.	Population.	1876.		1877.		1878.		1879.	
		Number of Deaths.	Ratio per mille.	Number of Deaths.	Ratio per mille.	Number of Deaths.	Ratio per mille.	Number of Deaths.	Ratio per mille.
(OUDH.)	(According to census of 1869.)								
Lucknow -	773,213	17,786	23	22,806	29.4	39,934	51.6	23,259	29.3
Unao -	945,736	22,009	23.2	17,233	18	38,351	40.5	45,972	45.4
Hardoi -	931,329	14,098	15.1	13,532	14.5	30,924	33.2	56,301	56.4
Bara Banki -	1,115,042	19,124	17.1	24,269	21.7	37,421	33.5	29,725	24.9
Rai Bareilly -	988,630	24,314	24.7	15,867	16	45,921	46.4	30,653	27.9
Sultanpur -	1,000,336	12,467	12.4	13,633	13.6	27,258	27.2	22,415	20.9
Partabgarh -	784,114	19,277	24.5	13,518	17.2	28,671	36.5	21,692	23.1
Fyzabad -	1,022,795	15,303	14.9	18,109	17.7	30,946	30.2	26,127	23.8
Gonda -	1,166,472	21,248	18.2	23,326	19.9	27,364	23.4	42,059	33.6
Bahraich -	774,437	17,609	22.7	14,811	19.1	18,079	23.3	32,488	39.2
Sitapur -	932,145	17,321	18.5	16,216	17.3	26,668	28.6	33,109	33.1
Kheri -	739,283	17,178	23.2	11,584	15.6	13,094	17.7	20,936	26.4
Total -	11,173,538	217,734	19.4	204,904	18.3	364,631	32.6	384,736	34.4
GRAND TOTAL, N.W. P. AND OUDH.	41,942,594	937,490	22.3	840,538	20	1,521,666	36.2	1,914,498	44.8

43. The next statement shows the deaths arranged by the months. The mortality, which had been low in the earlier part of 1877, began to rise in November and December and attained its maximum in April. It then decreased in July, after which it rose again to its second maximum in October, and then fell continuously, marking about 75,000, 62,000, and 72,000 in the months of January, February and March 1879.

STATEMENT SHOWING THE NUMBER OF DEATHS (BY MONTHS) IN THE NORTH-WESTERN PROVINCES AND OUDH.

Months.	1876.	1877.	1878.	1879.
January -	62,584	50,427	137,161	75,387
February -	57,963	43,999	140,173	62,837
March -	72,931	61,439	143,760	71,874
April -	80,892	78,408	157,326	87,302
May -	86,455	83,443	136,867	100,040
June -	94,388	70,960	120,767	83,802
July -	73,637	65,551	91,619	73,120
August -	79,161	66,090	113,701	131,702
September -	96,750	57,169	120,607	196,135
October -	91,059	63,066	138,997	429,115
November -	74,995	83,656	127,656	369,390
December -	66,675	116,330	93,032	233,794
TOTAL -	937,490	840,538	1,521,666	1,914,498

44. The third statement shows the causes to which the mortality has been attributed. Cholera is the only one which does not show an increase in 1878. The small-pox epidemic was extremely severe; it began in December 1877, and rose to its maximum in May 1878, when 44,469 deaths were ascribed to this cause. Deaths from bowel complaints began to be numerous in December, rose to 27,120 in February 1878, and then declined. Fever, to which in 1877 about 45,000 monthly deaths were ascribed, rose in December 1877, and from then to September 1878 averaged about 80,000 deaths per mensem: while in October and November the still greater mortality of 110,000 per mensem was ascribed to this cause.

STATEMENT SHOWING THE NUMBER OF DEATHS (BY DIFFERENT CAUSES) IN THE NORTH-WESTERN PROVINCES AND OUDH.

Cause.	1876.	1877.	1878.	1879.
Cholera -	48,311	31,770	22,251	35,892
Smallpox -	40,795	36,022	170,446	73,653
Fevers -	658,211	574,722	981,004	1,616,107
Bowel complaints -	96,171	84,615	165,334	73,124
All other causes -	94,002	113,409	182,631	115,722
TOTAL -	937,490	840,538	1,521,666	1,914,498

45. There has been considerable discussion regarding the connection between this mortality and the scarcity induced by the drought of 1877. The Honourable the Lieutenant-Governor considers that all diseases which can be ascribed to a specific cause should be set apart as unconnected with famine. Referring to the epidemic of fever in the autumn of 1878 he says that the deaths from it "are no more to be ascribed to the scarcity than if the people had died of surfeit." Deaths from small-pox also he would set altogether aside. "small-pox is unmistakable, and when a person dies of it, I think the death should be assigned to the true cause, viz., the disease, and not attributed to a prevailing scarcity because the person seized might, but for the want of sufficient food consequent on the scarcity, have been able to cope with it." The excessive cold during part of December 1877 and January 1878 also added to the mortality: the year 1878 was, in his Honour's opinion, an exceptionally unhealthy year.

46. On the other hand, Dr. Cunningham, the Sanitary Commissioner with the Government of India, writes as follows (26th October 1878):—"It must be considered that a population reduced to a low state of vitality by want of sufficient food must present a most favourable field for every epidemic disease. Judging by the statistics of the Punjab—the only available ones on the subject—the mortality from small-pox falls heaviest on children between one and twelve years of age, and there is no class that is likely to suffer more from deficient nourishment. To me it seems impossible to discover the prevalence of any disease from scarcity or famine pressing on the population at the time. Prevalence of disease means either: (1) a generally unhealthy year—generally unhealthy from causes which are still extremely obscure; or (2) insanitary conditions in the locality otherwise known as local disease causes; or (3) unfavourable condition of the people themselves. These causes run one into another, that is to say, they may all three be present and more or less active at the same time, so that it may be, and probably will be, impossible to decide how much of the sickness and mortality ought properly to be ascribed to each. But the third cause, when it exists, can never be ignored altogether. If the people are in an unfavourable condition—and there can be no condition more unfavourable to health than want of food—then this condition must have its influence—and in all probability a very great influence—on the extent and severity of the prevailing sickness by whatever name it may be called, whether cholera, or small-pox, or anything else."

47. The soundness of these views can hardly be gainsaid, and in fact the difference between these two authorities seems to be more a difference in the point of view than in the conclusions to be drawn from the facts. Sir G. Couper agrees that previous innutrition diminishes the vital powers of the frame in contending with disease, and that is all, or nearly all, that Dr. Cunningham asserts. But Sir G. Couper claims that such deaths should not be attributed to famine, by

¹ Minute dated 3rd February 1879.

which he means apparently to assert that they should not be looked on as so directly connected with famine that they could have been prevented by famine-relief measures. This is the administrative point of view, and with this Dr. Cunningham would no doubt agree. Indeed, the whole object of this note is to show that not only famine, but even scarcity causing high prices in a fairly well-to-do Province, results in mortality to a degree of which we hitherto have had little or no idea. It seems that the doctrine must be accepted as an axiom, that drought and scarcity will be attended by great sickness among the people who feel the consequent pressure of high prices, and will sooner or later be followed by exceptional mortality.

48. One more point remains to be touched on. The assumption was made here, as in every other Province, that the deficiencies of registration are tolerably normal, and that the figures of 1878 bear to the true figures the same relation that was borne in previous years. It is urged, however, that in the North-Western Provinces a great improvement in registration took place in 1878 and the officers¹ appointed to make special enquiries into the causes of mortality, and classes affected by it have reported that much greater attention was paid to the subject than before. On the other hand, the reports of at least two of those officers showed that a considerable number of deaths were still unrecorded, and that the difficulties in the way of accurate registration (arising from the wandering of the famine-stricken, the deaths of unknown strangers, and the destruction of entire families) were much greater than usual. On the whole, it may perhaps be fairly held that these two arguments counterbalance each other, and that the registration at least did not fall off in accuracy (as it is held to have done in Madras and Mysore) under the abnormal pressure of famine. The fact also that the death-figures of January-March 1879 have fallen to almost the same level as those of January-March 1876, seems to show that the registration is much on a par now as to accuracy with what it was then.

49. The registration of births is not attempted in the North-Western Provinces and Oudh. If it were there can be little doubt that the latter months of 1878 and the earlier months of 1879 would show a considerable decrease in the birth-rate of the Province. One of the officers referred to in the preceding paragraph (Captain Pitcher) was informed that the fact of diminished fecundity had been observed and was notorious among the people.

50. The diagram on the page opposite illustrating the mortality of the three Provinces of Northern India, shows great differences in the curve of each, and in this respect contrasts with that given for Madras and Bombay, in which the curves were so similar. The only point in which all the three curves agree is in representing 1877 as a much healthier year than 1876. The curve for the North-Western Provinces and Oudh shows the influence of the famine most distinctly; it rises in November and December directly after the rain crop had failed, had reached an extraordinary height in January, February and March, which are usually the healthiest months in the year; culminates in April, and then descends till the outbreak of fever sends it up again to a second apex in October. It is only in this last rise that the Punjab line, which had remained moderately high early in the year, resembles it. The Central Provinces line does not reach an excessive height till after May; but having done this, it hardly begins to fall materially till after September. In other words, the North-Western Provinces curve reaches an enormous height early in the year under the influence of famine: the Punjab (excluding the fever of September and November) and the Central Provinces stand throughout at a moderate altitude under the influence of high prices and scarcity.

GENERAL SUMMARY.

51. This note has now touched on the statistics of all those parts of India in which vital statistics are recorded. The system of registration varies in efficiency, and is

more accurate in some parts than in others; but still it has been shown that in each instance the register is a sensitive index, rising and falling in accordance with the known facts of the case. The following is a summary of the results indicated by these registers, adopting throughout the assumption that the registration of the famine period bears to the true mortality the same relation that it does in ordinary years, and that the true rate of mortality in ordinary years is about 35 per mille. So far as the registration was more or less accurate in 1877 and 1878 than in ordinary years, so far some deduction should be made from, or some addition made to, the excess mortality brought out by this calculation:—

Province or Presidency.	Population under registration	Period.	Excess mortality.	Decreased births.
Madras - - -	29,027,972	1877 & 1878	2,000,000	800,000
Bombay - - -	13,939,326	Do.	800,000	230,000
Mysore - - -	5,055,412	Do.	675,000	
Central Provinces - -	7,403,074	1878	200,000	
Punjab - - -	17,437,125	Do	340,000	
North-Western Provinces and Oudh -	41,942,594	{ Novr 1877 { Dec. 1878	1,265,000	
Total - -	114,910,503		5,280,000	

If Dr. Cornish's view be accepted, that the decrease in the birth-rate is not ended but will continue to be felt in 1879, so that 25 per cent. should be added to the decrease already registered in 1877 and 1878, then we have to place to the account of the famine a diminution to the population of Madras and Bombay amounting to 1,290,000 births less than usual. The same rate of decrease, or 3 per cent. on the population, probably occurred in Mysore, making a loss of 150,000 births. Assuming that the rate of decrease was half as large in the North-Western Provinces and Oudh (the famine having lasted only one year instead of two), and a quarter as large in the Punjab and Central Provinces which were only visited with scarcity, not famine, those Provinces will have had altogether 815,849 less births than usual, or, say, 800,000. On this hypothesis the total check to the increase of the population by reason of the diminished birth-rate will have amounted to a loss of 2,250,000 lives, and, adding this to the excess mortality, we have the result that in the years following on the drought of 1876 and 1877, these territories (which numbered at the last census 115 million souls) have suffered a loss of $7\frac{1}{2}$ millions.

52. It cannot be affirmed too clearly that this great loss of life is not altogether to be ascribed to the *direct* operation of famine. Part, though how great a part it is impossible to say, was caused distinctly by starvation, either acute or in that chronic insidious form "giving rise to organic changes in the intestinal canal" which render the recovery of the famine-stricken "almost hopeless." But great part was also due to the indirect effects of famine—the wandering, the exposure, the feeding on unwholesome food; or to the effects of fasting, by which the frames of people became more prone to be attacked by disease, and were rendered less capable of resisting those attacks; and it may be that the abnormal atmospheric conditions intensified and prolonged the epidemics. Doubtless also the aggregation of people in large numbers on relief-works and in relief-houses favoured disease.

53. It is obvious that only a small portion of these deaths are in any way preventible by relief measures on the part of Government. The great majority of them are beyond the reach of any human intervention. In our former state of knowledge it was easy and proper for Government to declare it to be their aim that no life should be lost. But since those declarations were made, the registration of vital statistics has placed a totally new instrument in our hands, and has opened our eyes to much that was going on unobserved around us. Estimates of mortality which were made in perfect good faith a decade of years ago, have become impossible now. It is essential for us not to close our eyes to these facts, but to accept the position that, do what we will, every famine must be accompanied by immense loss of life.

C. A. E.—21-5-79.

¹ Messrs. Bennett and Roberts, and Captain Pitcher.

BERAR.

50A. In Berar, as in the Central Provinces, much attention has been paid to the registration of vital statistics, and the percentage borne by the recorded deaths to the population is higher than in any other part of India. For the seven years, 1871 to 1877, it has been 29·4 per mille, but in 1878 it suddenly rose to the unprecedented figure of 81·5 per mille. The causes which led to this terrible mortality are stated by the Commissioner (Mr. Jones) to have been—(1) The general unhealthiness of the year; (2) high prices and scarcity,

accompanied by consumption of old grain taken from grain pits, and by reduced food consumption on the part of all but the richer classes, and consequent depressed vitality of the people; (3) an intense outbreak of cholera and abnormal prevalence of malarious fever; (4) deficient water-supply in the earlier months and unusually heavy rainfall in the monsoon period.

50B. The first statement shows the mortality by district. Basim heads the list with a mortality of 106·4 per mille; it was in this district that cholera was most severe.

STATEMENT SHEWING THE NUMBER OF DEATHS (BY DISTRICTS) IN BERAR.

Districts.	Population according to Census of 1867.	1876.		1877.		1878.	
		Number of deaths.	Ratio per mille.	Number of deaths.	Ratio per mille.	Number of deaths.	Ratio per mille.
Amraoti - - -	501,331	17,113	34·1	12,354	24·6	39,335	78·5
Ellichpur - - -	238,356	9,475	39·7	6,554	27·4	18,549	77·7
Wun - - - - -	323,689	8,670	26·7	6,954	21·4	20,074	62·
Basim - - - - -	273,646	8,380	30·3	7,837	28·3	29,431	106·4
Akola - - - - -	480,657	16,728	34·8	16,383	34·1	44,636	92·9
Buldana - - - -	366,309	9,457	25·8	11,377	31·1	26,379	72·0
Total - - - - -	2,186,988	69,832	31·0	61,459	28·1	178,404	81·5

50C. The next table shows the monthly deaths. The mortality began to increase from January 1878, and reached its maximum in August: it was still considerably above the monthly average in December.

STATEMENT SHEWING THE NUMBER OF DEATHS (BY MONTHS).

Month.	1876.	1877.	1878.
January - - -	3,752	4,620	5,170
February - - -	3,401	3,598	4,953
March - - - -	3,408	4,556	6,620
April - - - - -	4,094	5,672	9,781
May - - - - -	4,900	6,292	14,803
June - - - - -	4,000	4,767	20,757
July - - - - -	5,805	4,510	23,554
August - - - -	9,552	5,784	32,333
September - - -	10,058	5,921	25,233
October - - - -	8,215	5,397	16,819
November - - -	6,830	5,368	10,682
December - - -	5,757	4,974	7,699
Total - - - - -	69,832	61,459	178,404

50D. The third statement shows the alleged causes of the mortality. Cholera numbered more victims than had ever been known before, it began in April, and reached its maximum (11,263 deaths) in August, nor was it altogether extinct in December. Small-pox, though prevalent, had been more prevalent in 1877; but under the other three heads the figures stand higher than in any previous year.

50E. These returns are the more remarkable, because though prices were high in Berar, they never reached famine rates (in the months of worst mortality the price of jowari ranged from 14 to 18 seers per rupee), the Province is undoubtedly well to do, and there was

no official recognition of the existence even of severe scarcity such as to require relief. There may be some error in the figures, and I understand that an official enquiry is to be made into their accuracy. If this is

STATEMENT SHEWING THE NUMBER OF DEATHS (BY DIFFERENT CAUSES).

Cause.	1876.	1877.	1878.
Cholera - - -	2,683	842	34,306
Small-pox - - -	415	6,380	5,850
Fevers - - - -	39,875	34,453	85,260
Bowel complaints -	16,388	10,543	27,577
All other causes -	10,471	9,241	25,411
Total - - - - -	69,832	61,459	178,404

established, the only possible conclusion seems to be, that the Province suffered more severely from the abnormal season and the failure of the crops of 1877 than was suspected at the time. Assuming the ordinary mortality to be about 35 per mille, or 76,473 deaths, and the registration of 1878 to have been defective in the same proportion as that of the preceding years, the real number of deaths was 212,381, or 135,908 in excess of the average.

50F. The birth registers support the conclusions drawn from the abnormal mortality in the usual way. The ratio of births was 5 per mille less than in the two previous years, implying a falling off of about 10,000 births. The numbers registered in each month are not reported, so that the period of the year when the decrease began cannot be shown. But the real effect of the sufferings of 1878 on the reproductive powers of the people will be seen in 1879 more clearly than in 1878.

STATEMENT SHEWING THE NUMBER OF BIRTHS (BY DISTRICTS) IN THE HYDRABAD ASSIGNED DISTRICTS.

Districts.	Population according to Census of 1867.	1876.		1877.		1878.	
		Number of births.	Ratio per mille.	Number of births.	Ratio per mille.	Number of births.	Ratio per mille.
Amraoti - - - - -	501,331	18,900	37·7	18,841	37·5	15,781	31·5
Ellichpur - - - -	238,356	8,278	34·8	9,149	38·3	8,161	34·2
Wun - - - - -	323,689	11,500	35·5	12,122	37·4	11,031	34·1
Basim - - - - -	273,646	9,110	32·9	9,408	34·	8,090	29·5
Akola - - - - -	480,657	23,007	47·9	22,608	47·0	19,919	41·4
Buldana - - - - -	366,309	14,231	38·8	14,180	38·7	12,673	34·6
Total - - - - -	2,186,988	85,326	39·1	86,308	39·4	75,655	34·6

BENGAL.

50c. The Bengal Registration Statistics need not be reproduced with the same fulness as those of the other Provinces, as there was nothing abnormal about them, and the returns are extremely imperfect. It is sufficient to state the total of the Province.

Year.	Deaths.	Per mille.
1876 - - -	983,400	16.4
1877 - - -	1,077,601	17.97
1878 - - -	1,064,116	17.73

In 1878 cholera was a little less prevalent, and fever a little more so than usual; but there was nothing deserving especial remark. Birth registration is still in its infancy in Bengal, having only commenced all over Bengal in 1877, while it was confined to municipalities only in 1878.

Postscript.—It has been suggested that this note would be made more complete if I added statistics to show what the variations in mortality in other years have been, and by how much the death-rate in one year may exceed another without the excess being assignable to any very special cause, such as the famine of 1877-78. Dr. J. M. Cunningham has already pointed out that “Tropical countries like India show much greater fluctuations in the annual death-rate than are met with in other parts of the world. In Great Britain and

“Ireland, for example, the annual mortality fluctuates very little. In England and Wales together, as shown in the Registrar General’s report for 1876, the death-rate between 1847 and 1876 has varied only between 20.5 and 25.1, or 5 per 1,000 in 30 years. In Scotland, during the ten years 1867-1876, the range was from 15.77 to 18.48, or less than 3 per 1,000. The extreme variations to be met with in India in different years are best illustrated by the experience of the European troops, because from race and more or less unacclimatisation they are most sensitive to the unknown causes which make one year healthy and another year unhealthy. In the Bengal Presidency during the ten years 1860 to 1869, the annual death-rate has fluctuated between 20.11 per 1,000 and 45.93, or more than double. During the last eight years the fluctuation, although on a lower set of figures, has been even more marked, from 11.64 in 1877 to 27.45 in 1872. Great variations, though not to the same extent, may naturally be expected among the general population of the country, but this explanation does not appear to apply to those portions of the North-Western Provinces and Oudh, where the people suffered so much in the ten months from November 1877 to August 1878.”

In order to elucidate this position he has done me the favour of preparing a set of statements shewing the annual mortality rates since 1871, of which the following is an abstract:—

MORTUARY STATISTICS OF THE NATIVE POPULATION OF—

	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.
North-Western Provinces	19.55	22.77	22.91	21.84	21.82	23.39	19.67	35.62
Oudh - - -	16.87	16.99	14.16	11.81	16.25	18.21	included in N.-W.P.	35.96
Punjab - - -	21.	24.63	20.42	18.11	25.57	28.41	20.	35.96
Central Provinces - -	16.23	24.96	19.30	23.48	26.32	30.38	23.91	46.004
Berar - - -	17.72	37.1	22.83	27.9	40.2	31.9	28.1	81.5
Bombay - - -	19.78	24.15	17.92	17.17	23.15	21.81	38.76	32.9
Madras - - -	18.09	16.86	16.94	17.5	21.1	23.3	53.2	27.8

British Troops.

Bengal Presidency - -	17.83	27.45	15.40	14.62	17.32	16.02	11.64	—
Madras - - -	20.10	18.98	18.29	12.96	14.85	15.77	16.83	—
Bombay - - -	14.02	18.86	11.72	10.64	20.92	12.30	12.09	—

Native Troops.

Bengal Presidency - -	17.81	16.57	13.02	10.94	13.55	11.29	10.32	—
Madras - - -	10.62	12.32	8.29	9.75	10.59	11.04	11.80	—
Bombay - - -	10.6	10.4	7.4	7.8	9.3	13.11	10.9	—

Jails.

Bengal Presidency - -	34.52	43.58	43.08	39.9	33.65	37.51	31.88	—
Madras - - -	17.9	22.26	28.32	26.63	38.68	42.49	176.01	—
Bombay - - -	26.6	29.1	29.4	20.5	28.2	20.6	54.37	—

In the North-Western Provinces the variations had only been from 19½ to 23½ till the rate suddenly rose in 1878 to 35. In the Punjab the death-rate oscillated between 18 and 23 per mille up to 1877, but rose in 1878 to 36. In the Central Provinces it varied from 16 to 30 per mille, and only in 1878 did it reach 46. In Berar the variations have been very great even in ordinary years, ranging between 17.5 and 40: in 1878 the rate is more than double the highest ever reached before. In Bombay the range was between 17 and 24, and in Madras between 17 and 23, till the famine supervened. None of these oscillations can be compared with the excessive rate produced by the famine.

It is remarkable that the unhealthiness of the year 1877 in Bombay and Madras produced no effect on the death-rate among the British and Native troops, which

was almost identical with that of 1876. Among the jail prisoners, on the contrary, the increase in mortality is most marked, as must be expected when crime is largely increased by hunger. Many of these poor creatures were driven to theft by absolute starvation, and all shared, when they came into jail, in the low and depressed condition of the people at large.

These statistics, then, testify unmistakably that, although the variations in mortality are very great, and although the effects of epidemic diseases sweeping over the people are more severe than in European countries, still the increase in the death-rate due to them has never yet been equalled by the increase caused by the most fatal epidemic of all—famine, or even by its modified form of scarcity and high prices.

8th August 1879.

C. A. E.

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DIAGRAM SHEWING THE MONTHLY NUMBER OF REGISTERED DEATHS

MADRAS ----
BOMBAY.....

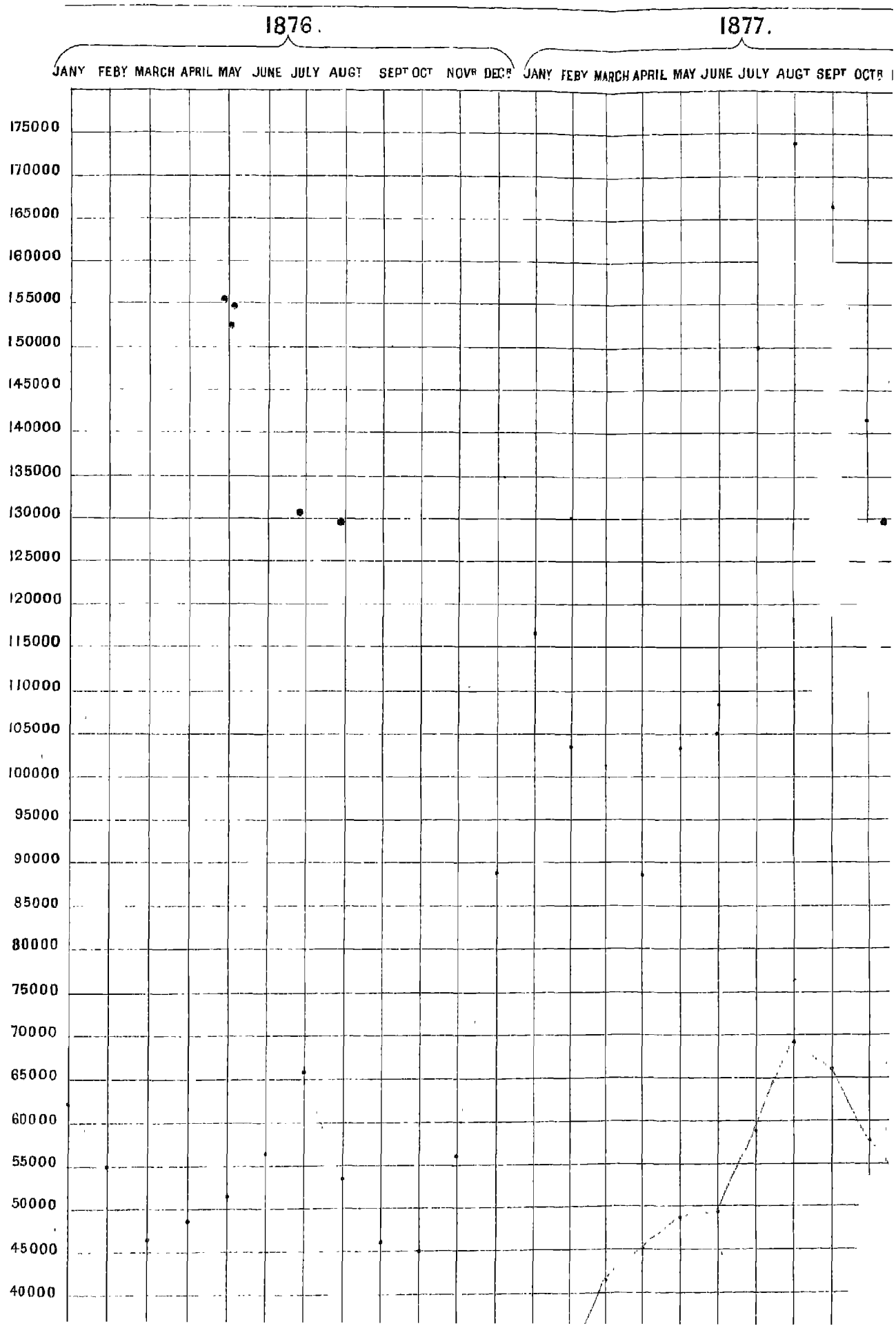


DIAGRAM SHEWING THE NUMBER OF MONTHLY REGISTERED BIRTHS IN MADRAS AND BOMBAY

MADRAS

BOMBAY

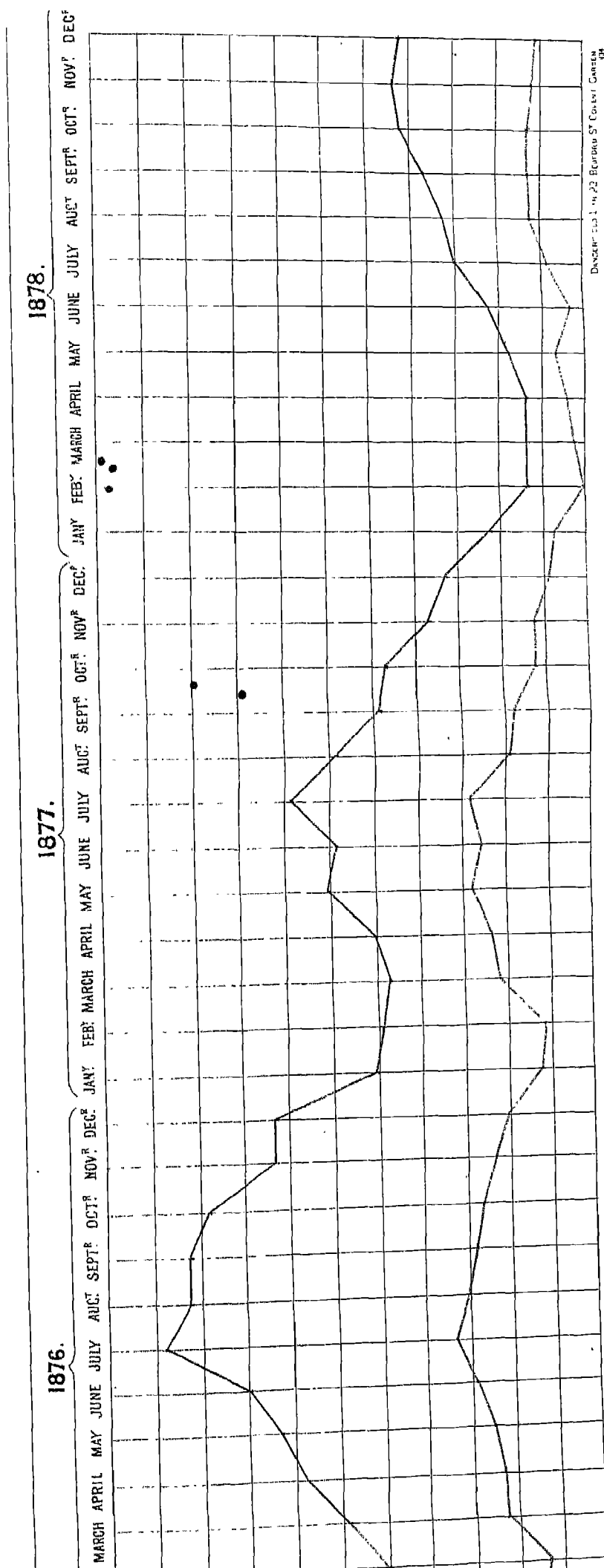


DIAGRAM SHEWING THE REGISTERED

CENTRAL PROVINCES, PUNJAB
 WITH WEST PROVINCES AND OUDH
 PUNJAB
 CENTRAL PROVINCES

